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pplication for Certification for

San Francisco Electric Reliability Project

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California Energy Commission

acramento, California



Applicant:

City and County of San Francisco

March 2004

APR 26 2005

Office of the Mayor
City & County of San Francisco

Gavin Newsom

March 17, 2004

Mr. Robert Therkelsen
Executive Director
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Dear Mr. Therkelsen:

In accordance with the provisions of Title 20, California Code of Regulations, the City and County of San Francisco hereby submit this Application for Certification (AFC) seeking authority to construct and operate the San Francisco Electric Reliability Project (SFERP), a 145-megawatt, natural gas-fired, peaking power plant to be located in the City of San Francisco.

The project will employ advanced, high-efficiency combustion turbine technology and selective catalytic reduction to minimize facility emissions. The project will use recycled water from an onsite treatment plant.

Construction and operation of this plant will also allow for a net reduction in air emissions and the closure of Hunters Point Power Plant, important goals of the City of San Francisco.

As an official of the City and County of San Francisco, I hereby attest, under penalty of perjury, that the contents of this application are truthful and accurate to the best of my knowledge.

Sincerely,

Jesse Blout
Economic Development Director

1 Dr. Carlton B. Goodlett Place, Room 200, San Francisco, California 94102-4641
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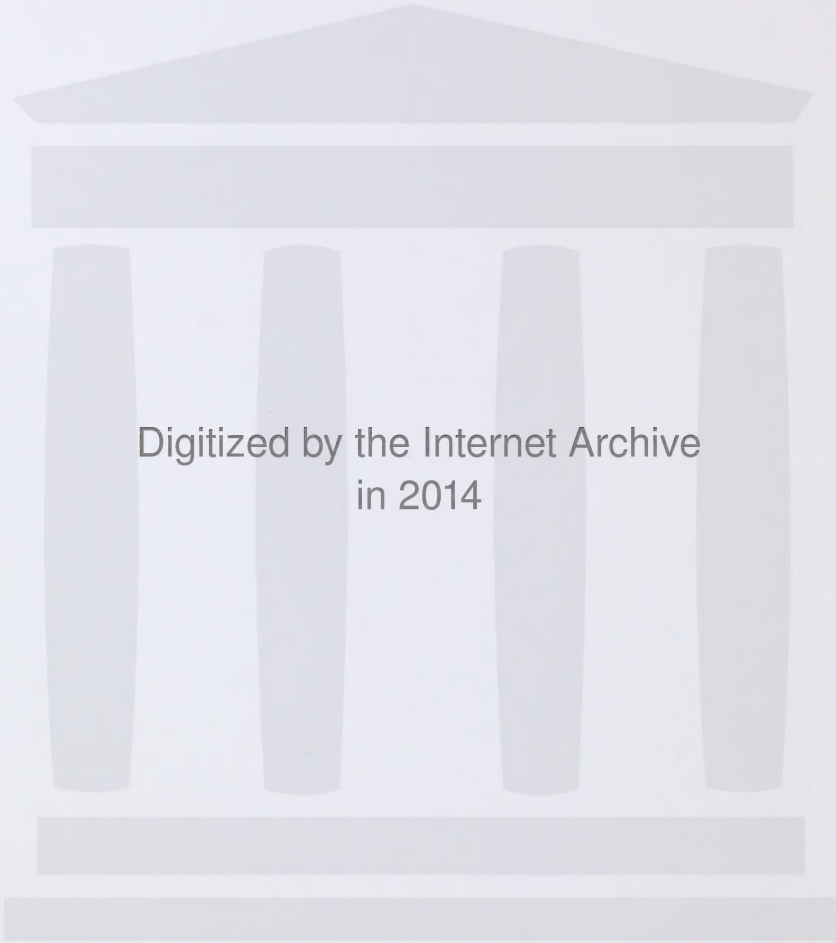
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Acronyms and Abbreviations

°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AC	alternating current
ACGIH	American Conference of Government Industrial Hygienists
AFC	Application for Certification
AFY	acre-feet per year
ANSI	American National Standards Institute
APLIC	Avian Power Line Interaction Committee
ASME	American Society for Mechanical Engineers
AST	aboveground storage tank
BAAQMD	Bay Area Air Quality Management District
Bay	San Francisco Bay
BMP	best management practice
CAA	Clean Air Act
CAISO	California Independent System Operator Corporation
CalARP	California Accidental Release Program
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAS	Chemical Abstract Service
CBC	California Building Code
CCR	California Code of Regulations
CCSF	City and County of San Francisco
CDC	California Department of Conservation
CDFG	California Department of Fish and Game
CDM	Camp Dresser & McKee
CDMG	California Division of Mines and Geology

CDOGGR	California Division of Oil, Gas, and Geothermal Resources
CDPD	Cellular Digital Pocket Data
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CHP	California Highway Patrol
City	City of San Francisco
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
County	County of San Francisco
CPUC	California Public Utilities Commission
CRT	cathode ray tube
CSC	California species of special concern
CSO	combined sewer overflow
CTG	Combustion Turbine Generator
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
DC	direct current
DCIS	Distributed Control and Information System
DI	deionized
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EAF	equivalent availability factor
E&E	Ecology and Environment, Inc.
EDI	electrodeionization

EHS	extremely hazardous substance
EMF	electric and magnetic fields
EPCRA	Emergency Planning and Community Right-To-Know Act of 1986
ERPG	Emergency Response Planning Guideline
ESCP	Erosion and Sedimentation Control Plan
ESU	Evolutionarily Significant Unit
FAA	Federal Aviation Administration
Farmland	Prime Farmland, Unique Farmland, or Farmland of Statewide Importance
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FMMP	Farmland Mapping and Monitoring Program
FSA	Final Staff Assessment
g	gravity acceleration, 9.8 meters squared per second
GHz	gigahertz
g/m^2/year	grams per square meter per year
gpd	gallons per day
gpm	gallons per minute
GW	gigawatt
GWh	gigawatt hours
HHV	higher heating value
HMBP	Hazardous Material Business Plan
HRSG	heat recovery steam generator
HSP	Health and Safety Plan
Hz	hertz
IA	Interconnection Application
IDLH	immediately dangerous to life and health
IEEE	Institute of Electrical and Electronics Engineers
I/O	input/output

ISO	Independent System Operator
kH	kilohertz
kV	kilovolt
kV/m	kilovolts per meter
LC	load center
LD_{50}	Dose lethal to 50 percent of those tested
LDLO	lowest published lethal dose
LEL	lower explosion limit
LEPC	local emergency planning committee
LO/TO	lock-out/tag-out
LORS	laws, ordinances, regulations, and standards
mA	millamperes
MBR	Membrane BioReactor
MBtus/day	million British thermal units per day
MCC	motor control center
MCE	maximum credible earthquake
MGD	million gallons per day
mG	milligauss
MGP	manufactured gas plant
mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
MHz	megahertz
mm Hg	millimeters of mercury
MRZ	Mineral-Resource Zone
MSDS	Material Safety Data Sheet
MW	megawatt
Mw	moment magnitude
NESC	National Electric Safety Code
NFPA	National Fire Protection Association

NH_3	pure ammonia
NIOSH	National Institute of Occupational Safety and Health
NO, NO_2	nitrogen oxide gases
NO_x	oxides of nitrogen
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
OSHA	Occupational Safety and Health Administration
PAHs	polynuclear aromatic hydrocarbons
PG&E	Pacific Gas and Electric Company
PHGA	peak horizontal ground acceleration
PM_{10}	particulates
POC	precursor organic compound
Potrero PP	Potrero Power Plant
PP	power plant
PPE	personal protective equipment
ppm	parts per million
ppmvd	parts per million volume, dry
PRC	Public Resources Code
PRMMP	Paleontological Resource Monitoring and Mitigation Plan
psig	pounds per square inch gauge
PSM	Process Safety Management Plan
Pub. L.	Public Law
RCRA	Resource Conservation and Recovery Act
RMP	Risk Management Plan
RMPP	Risk Management and Prevention Program
RO	reverse osmosis
ROW	right-of-way
RQ	reportable quantity
RUSLE	Revised Universal Soil Loss Equation

RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SCADA	Supervisory Control and Data Acquisition
SCR	selective catalytic reduction
SERC	State Emergency Response Commission
SFBC	San Francisco Building Code
SFBRWQCB	San Francisco Regional Water Quality Control Board
SFDPH	San Francisco Department of Public Health
SFERP	San Francisco Electric Reliability Project
SFO	San Francisco International Airport
SFPUC	San Francisco Public Utility Commission
SIS	System Impact Study
SMIP	Site Mitigation and Implementation Plan
SOx	sulfur oxide
SPCC	Spill Prevention Control and Countermeasure Plan
SPRR	Southern Pacific Railroad
STEL	short-term exposure limit, 15-min. exposure
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TPQs	Threshold Planning Quantity
TPY	tons per year
TQ	Threshold Quantity
UBC	Uniform Building Code
UMB	Unreinforced Masonry Building
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

USGS	U.S. Geological Survey
WDR	waste discharge requirement
WGNCEP	Working Group on Northern California Earthquake Potential
WPCP	Water Pollution Control Plant
WPS	water pump station

SECTION 1.0

Executive Summary

SECTION 1.0

Executive Summary

1.1 Introduction

The City and County of San Francisco (CCSF or City) is proposing to construct and operate a simple-cycle peaking power plant, the San Francisco Electric Reliability Project (SFERP), in San Francisco.

This Application for Certification (AFC) for the SFERP has been prepared by CCSF in accordance with the California Energy Commission's (CEC's) Power Plant Site Certification Regulations (August 2000). It:

- A detailed description of the proposed project
- An assessment of the Project's likely impact on the existing environment
- Measures proposed by the City to minimize project impacts

The SFERP is being pursued by the City to reduce the need for existing unreliable and highly-polluting in-City generation while maintaining the reliability of the electric system. According to the California Independent System Operator, the SFERP will enable closure of the Hunters Point Power Plant, a City objective since 1998, provided the eight transmission projects that are currently planned or under development are completed. The SFERP will also support closure of dirty units at the Potrero Power Plant (Potrero PP) as further transmission upgrades, renewable resources and improvements in energy efficiency are put into place within, and in the vicinity of, the City.

The City is committed to minimizing impacts on the community in Southeast San Francisco, where the SFERP will be located. The City recognizes that the Southeast San Francisco community has been disproportionately impacted by industrial facilities including electric power generation. The SFERP will emit substantially less NO_x than existing in-City generation. Nonetheless, the City will offset NO_x emissions from the SFERP using local offsets to the extent feasible, and will develop a PM_{10} mitigation and community benefits package to ensure that the SFERP results in a net improvement in air quality for residents of Southeast San Francisco.

The generating units that comprise the SFERP have been made available to the City as part of a global settlement between the Williams Energy Marketing and Trading Company and a large number of parties including numerous state entities and the City. The settlement resolved claims associated with the 1999-2001 energy crises and provided the City with four nature-gas-fired- LM 6000 turbines along with a budget for their development. The City has a power purchase agreement for sale of the output of the four turbines to the California Department of Water Resources at cost, provided that certain conditions are met.

The City's four unit project to improve electric reliability and provide for closure of existing in-City generation will consist of two separate sites. The SFERP at the Potrero site, for which this AFC is being submitted, consists of three of the units available to the City for

development. The City is exploring alternative locations to site the fourth unit. Once a site for the fourth unit is identified, the City will assess and comply with permitting requirements that apply to that unit in light of the facility's size, configuration, and location.

1.2 Project Overview

The SFERP will consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired LM 6000 gas turbines and associated infrastructure. The project site is located adjacent to the San Francisco Bay in the Potrero District of San Francisco, within the existing Potrero PP site, owned and operated by Mirant Potrero, LLC. The SFERP will be located on a portion of the previously proposed Potrero Unit 7 site.

The project will include the construction of a new air insulated 115-kV switchyard on the west side of the site. A pipeline tie-in will be made to an existing PG&E natural gas load center located adjacent to the PG&E Potrero Substation. Process water for the project would be delivered via a City water pump station located on Marin Street near Cesar Chavez to a new water treatment plant located on the southern portion of the project site, adjacent to 23rd Street.

Electrical generation will be at 13.8 kilovolts, which will be stepped up with 115-kilovolt (kV) step-up transformers. The transmission line will interconnect the facility with PG&E's existing 115 kV electrical substation located adjacent to plant site on its west boundary. A new overhead transmission line will tie the adjacent PG&E substation to the plant switchyard.

Natural gas for the facility will be delivered through a new 250-foot-long, 12-inch diameter pipeline that will connect to PG&E's San Francisco Load Center, which is located on the western portion of the PG&E Potrero Substation. This service will be connected to a booster compressor station that will be part of the SFERP facility.

The City will provide process water to the SFERP through a new water pumping station (WPS) for onsite water treatment at the facility. The WPS will be located in an existing combined sewer system structure and will include three variable frequency drive pumps (two operational and one standby). A one-mile pipeline will connect the WPS and the SFERP's onsite treatment system. The one-mile pipeline consists of two parts. The southern portion of the alignment extends north from Marin Street along Mississippi Street for about 480 feet, and then east on Cesar Chavez Street for about 1,400 feet. This portion of the line will generally use an existing collection box that terminates near the intersection of Cesar Chavez Street and Indiana Street. The northern portion of the pipeline will run about 560 feet east on Cesar Chavez Street, then 1,880 feet north on Tennessee Street and then 1,360 feet east on 23rd Street to the SFERP water treatment facility inlet structure, located on the southern boundary of the project site. The onsite treatment system will be designed to produce Title 22-quality recycled water.

Plant wastewater and reject water from the SFERP's water treatment system will be discharged into the City's combined sewer system, which routes the waste to the Southeast Water Pollution Control Plant (SEWPCP).

A general vicinity map is presented as Figure 1-1 (figures are located at the end of this section); the plant site and location of linear facilities are presented in Figure 1-2; the site plan

is presented as Figure 1-3; a site layout is presented as Figure 1-4; and an oblique simulation of the plant is presented as Figure 1-5.

1.2.1 Project Objectives

The City has identified several basic objectives, consistent with the findings and recommendations contained in its Electricity Resource Plan (ERP), for the development of a power project. These objectives are:

- Improve the City of San Francisco's electricity reliability
- Facilitate the shutdown of older, more polluting in-City generation; and
- Minimize local impacts of electrical generation.

The City of San Francisco, PG&E, and the California Independent System Operator (CAISO) have extensively studied the electrical infrastructure in the City of San Francisco. Section 3 discusses the regional electrical system in the City and why the SFERP is needed, as part of a portfolio of resources, to maintain system reliability and provide for closure of existing power plants. As that section documents, the City is committed to maximizing energy efficiency improvements, developing renewable power, encouraging clean distributed generation and supporting needed transmission additions. Nonetheless, the siting of new, clean and operationally flexible generation is also necessary to provide for the near-term closure of the Hunters Point Power Plant and to address operational needs. The SFERP will also, in th elonger term, facilitate the closure of units at the Potrero Power Plant. Section 3, Purpose and Need, explains why new generating resources are needed to achieve the City's objectives, why currently planned transmission additions are insufficient to achieve the City's goals, and how the SFERP complements City efforts to develop energy efficiency improvements, renewable resources and clean distributed generation.

1.2.2 Project Site Selection

The criteria developed to evaluate the alternative sites' suitability correspond with the reasons the proposed site was selected. These criteria include the following:

- Environmental justice considerations
- Availability of sufficient land area
- Proximity to an existing substation
- Proximity to PG&E main gas pipeline
- Consistency with the General Plan and zoning ordinances, height restrictions, and existing land uses

1.3 Facility Location

The SFERP is located on the site of the former PG&E Potrero PP (now owned by Mirant Potrero, LLC). This site consists of approximately 4.5 acres of industrial land surrounded by industrial development. The site is located in the City of San Francisco and is zoned for industrial use. Development of a power plant in this area would be consistent with the zoning ordinance. The center of the SFERP site is located at approximately 37°45'24" N. latitude and 122°23'00" W. longitude in Township 2 S., Range 5 W. This township has never been surveyed into sections because it was part of an original Spanish land grant. All the proposed SFERP

facilities will be located within either the southernmost portion of the U.S. Geological Survey (USGS) San Francisco North or the northernmost portion of the San Francisco South 7.5' (1:24,000-scale) standard topographic maps. The site is located at Block 4175, Lot 6.

The site is adjacent to PG&E's 115-kV Potrero Substation. The existing substation has sufficient transmission capacity to serve a new 145-MW plant. Natural gas would be supplied to the new power plant from the PG&E main located at the corner of Illinois and 23rd streets. Additional natural gas compressors would be necessary to serve the new plant. Water supply for the proposed plant would be obtained from the City's combined sewer system via a pumping station, a pipeline, and an onsite primary, secondary, and tertiary treatment system that will produce Title 22-quality recycled water. Wastewater from the plant would be returned to the City's combined sewer system.

The plant would be located in an industrial area of San Francisco and would be screened by several tall industrial structures. The nearest residential uses to the project, which are potentially sensitive noise receptors, are located approximately 600 feet from the project.

Block and lot numbers and the names of the landowners within 1,000 feet of the site and within 500 feet of the linear corridors are included in Appendix 1A.

1.4 Project Schedule

Construction of the generating facility, from demolition, if applicable, site preparation and grading to commercial operation, is expected to take approximately 12 to14 months. Major milestones are listed in Table 1-1.

TABLE 1-1
Project Schedule Major Milestones

Activity	Date
Begin /Demolition	2nd Quarter 2005
Startup and Test	2nd Quarter 2006
Commercial Operation	2nd Quarter 2006

Normal construction will be scheduled between 7 a.m. and 8 p.m., Monday through Friday. During the startup phase of the project, some activities will continue 24 hours per day, 7 days per week.

1.5 Project Ownership

The power plant and transmission lines will be owned and operated by CCSF. Consistent with PG&E practice and California Public Utilities Commission (CPUC) law and regulation, the natural gas pipeline will be owned by PG&E. The potable water and process water lines will be owned by CCSF.

The initial capital cost of the SFERP is estimated to be $140 million. The estimated value of materials and supplies that will be purchased locally (within San Francisco) during demolition/construction is between $2 and $3 million.

1.6 Project Alternatives

The CEC conducts its review of alternatives to satisfy the Warren-Alquist Act and the California Environmental Quality Act (CEQA). Appendix B(f)(1) of the CEC Guidelines requires a discussion of the range of reasonable alternatives to the project, or to the location of the Project, which would feasibly attain most of the basic objectives of the Project but would avoid or substantially lessen any of the significant effects of the Project. To enable this review, the criteria and objectives that led to the selection of the site and design features of the proposed SFERP are provided, along with a detailed discussion of the range of alternatives considered (see Section 9.0).

A "No Project" alternative was considered and rejected as inconsistent with the City's objectives, including but not limited to an increase in the electrical system's reliability to San Francisco Public Utilities Commission's (SFPUC's) customers and to facilitate the shutdown of older, higher polluting in-City generation.

1.7 Environmental Justice

The City recognizes that Southeast San Francisco is a community of color with relatively high rates of serious respiratory diseases and that the Southeast San Francisco has been disproportionately impacted by industrial facilities. To address these concerns, Ordinance 124-01 sets forth requirements for any new fossil-fueled power generation at Potrero in Southeast San Francisco. The SFERP supports the objectives of Ordinance 124-01 by reducing emissions of NO_x, enabling closure of Hunters Point Power Plants, and supporting eventual closure of units at the Potrero PP. In addition, the City is committed to funding a meaningful PM10 mitigation and community benefits package to mitigate the adverse impacts of the SFERP on the community. Further, the City will undertake local air quality monitoring that will provide necessary information to support additional air quality improvement sin Southeast San Francisco.

1.8 Environmental Considerations

Sixteen different types of possible environmental impacts from the proposed project were investigated. Detailed descriptions and analyses of these issues are presented in Subsections 8.1 through 8.16 of this AFC. This section briefly summarizes the potential effects typically of greater interest to CEC staff and the public.

1.8.1 Air Quality

The site is located in an area designated as nonattainment for State and federal ozone air quality standards, and for State fine particulate matter (PM_{10}) standards. An assessment of the impact to air quality was performed using detailed air dispersion modeling. The air impacts from the Project will be mitigated by the use of state-of-the-art combustion turbine emission

control technology. The City has issued a request for proposals to emission reduction credit (ERC) holders to obtain sufficient ERCs to meet the offset requirements for this project. The City has committed to make reasonable efforts to obtain offsets locally. ERCs will be obtained to offset increases in emissions of precursor organic compounds (PVOCs) and NO_x (both precursors of ozone). In addition, the City intends to develop a PM_{10} mitigation and a community benefits plan. See Subsection 8.1 for a detailed analysis of air quality.

1.8.2 Water Resources

Water for the SFERP for process and cooling water, equipment wash water and the dual plumbing system (toilets) would be recycled water to be produced on the site at a new water treatment system included as part of the project design. The City will provide combined sewer system water from a water pumping station to be constructed on Marin Street near Cesar Chavez, about one mile from the site. A new pipeline will be installed along Marin, Mississippi, Cesar Chavez, Tennessee, and 23rd streets to convey the process water to a new water treatment system located on the southern portion of the project site, adjacent to 23rd Street.

The onsite treatment system will be designed to produce Title 22-quality recycled water, with the treatment system providing primary, secondary, and tertiary treatment plus disinfection either by ultraviolet system or chlorination. Potable water will be provided for fire protection, domestic uses, and emergency backup for cooling and process needs.

1.8.3 Visual Resources

The proposed SFERP features would change the existing landscape from a site that is paved and includes two very large and one smaller red brick buildings, one metal building, and tall weedy vegetation to a paved site with four buildings (one brick, and three that would be a combination of wood and metal), electrical and gas metering equipment, and an onsite road. Three 85-foot-tall stacks would be the tallest project features at the site. They would visually appear to be considerably shorter than the Potrero Unit 3 power plant building and one-third the height of Potrero Unit 3's stack.[1] The exteriors of all project elements would be treated with a neutral gray finish that would optimize visual integration with the surrounding environment. The exception is the one existing onsite brick building that would be retained and rehabilitated, and would continue to exhibit the red brick texture. With project implementation, much more of the site would be occupied with equipment than is currently the case, and the site, when viewed from adjacent parcels, would appear more orderly and maintained than it does now.

Although the proposed power plant is a peaking unit, it could be operated 24 hours per day, 7 days per week for periods of time. Its operation would require onsite nighttime lighting for safety and security. To reduce offsite lighting impacts, lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed onsite so that significant light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. For areas where lighting is not required for normal operation, safety, or security, switched

[1] The top of the existing Potrero stack is at elevation 303 feet. The tops of the three proposed stacks would be at approximately elevation 111 feet (85-foot-tall stacks constructed on land that is approximately elevation 26 feet msl).

lighting circuits would be provided, thus allowing these areas to remain dark at most times, minimizing the amount of lighting potentially visible offsite.

1.8.4 Noise

While the proposed SFERP will produce noticeable noise, the noise levels will be in compliance with San Francisco's Noise Ordinance requirements for industrial properties. Noise will also be produced at the site during the construction phase of the project. The construction noise may be audible at the nearest residences but is not anticipated to exceed current exposure levels and the noisiest construction activities will be confined to the daytime hours.

1.9 Key Benefits

1.9.1 System and Reliability

SFERP will enable closure of the Hunters Point Power PP in the near term, provided that eight transmission projects that are currently planned or under development are placed in service. In additions, renewable resources and energy efficiency improvements are put into place. Replacement of existing in-City generation with the SFERP will maintain and enhance reliability and environmental quality. The SFERP complements the City's efforts to promote energy efficiency, renewable resources, and clean distributed generation.

1.9.2 Environmental

SFERP will employ advanced, high-efficiency combustion turbine technology and selective catalytic reduction (SCR) to minimize emissions from the facility. Using natural gas for fuel, SFERP will be among the cleanest facilities of comparable size in the nation. Project NO_x emissions will be will be as much as 85 percent lower than those for existing older peaking facilities in the City. The City will obtain local emission offsets to compensate for the air emissions. The City will develop and implement PM_{10} mitigation and a community benefits package.

SFERP will also minimize freshwater use. Recycled water will be used for plant cooling and process water needs. This will allow for the commercial use of a wastewater stream and will have a net positive impact on water resources by reducing the amount of wastewater discharged to the San Francisco Bay.

1.9.2 Employment

Construction of the SFERP will eliminate the need for costly upgrades to allow Hunters Point Unit 4 to operate in the longer term, particularly the costs of installing new emissions control equipment. In addition, the SFERP will provide for local control over, and accountability with regards to, a strategically located new resource.

The workforce on the project during construction will peak at approximately 258 people, including construction craft persons and supervisory, support, and construction management personnel. In addition, it would provide approximately 11 full-time, living-wage jobs throughout the life of the plant.

1.9.3 Energy Efficiency

SFERP will be an efficient, environmentally responsible source of economic and reliable peaking energy to serve the growing energy demands of the City. SFERP will help ensure reliable, clean, low-cost electricity in the future.

1.10 Persons Who Prepared the AFC

Persons with primary responsibility for the preparation of each section of this AFC are listed in Appendix 1B.

1.11 Permitting Requirements

Each section provides a list of applicable federal, state, and local permits that would be required by each jurisdiction for the project.

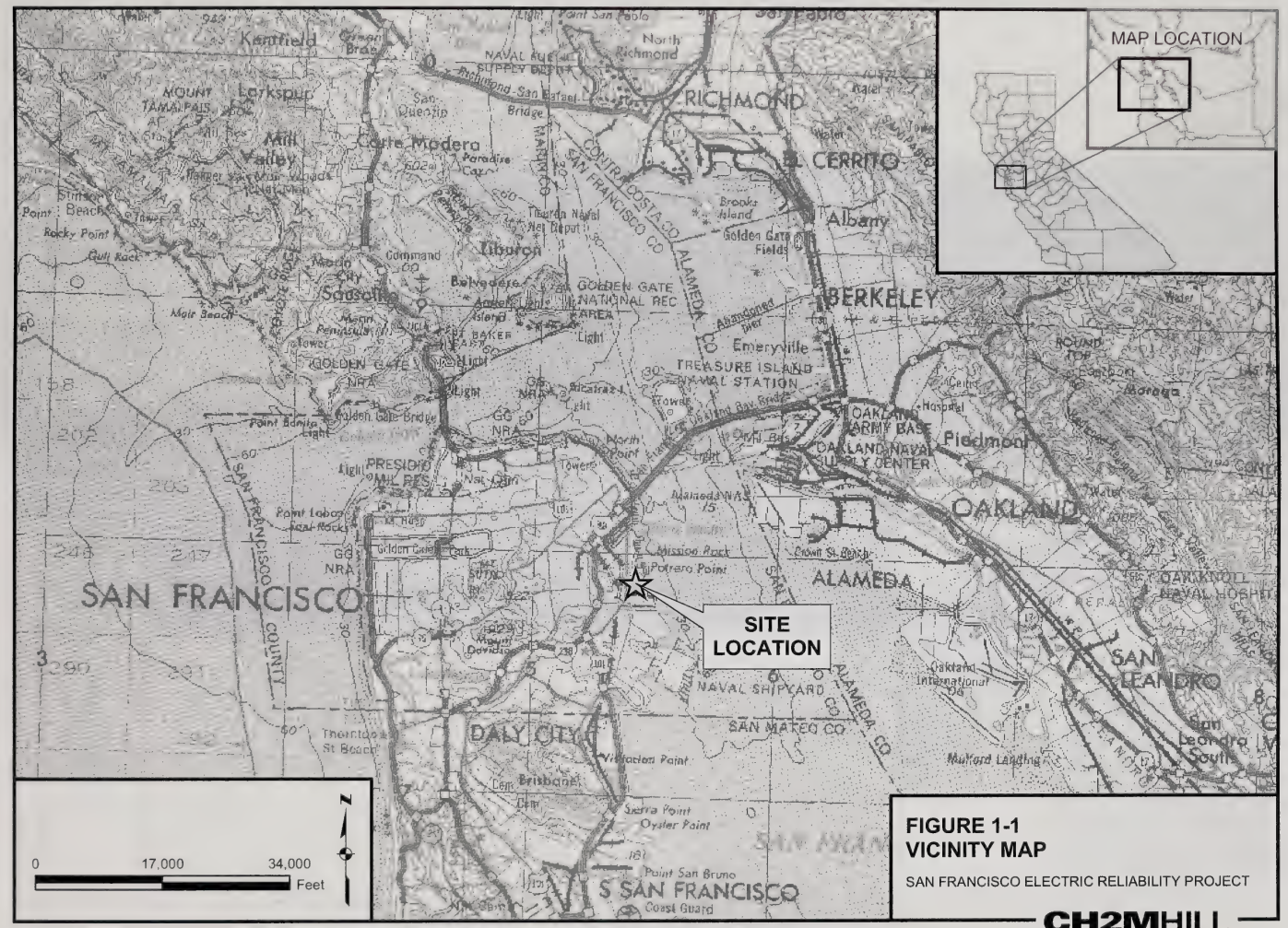


FIGURE 1-1
VICINITY MAP

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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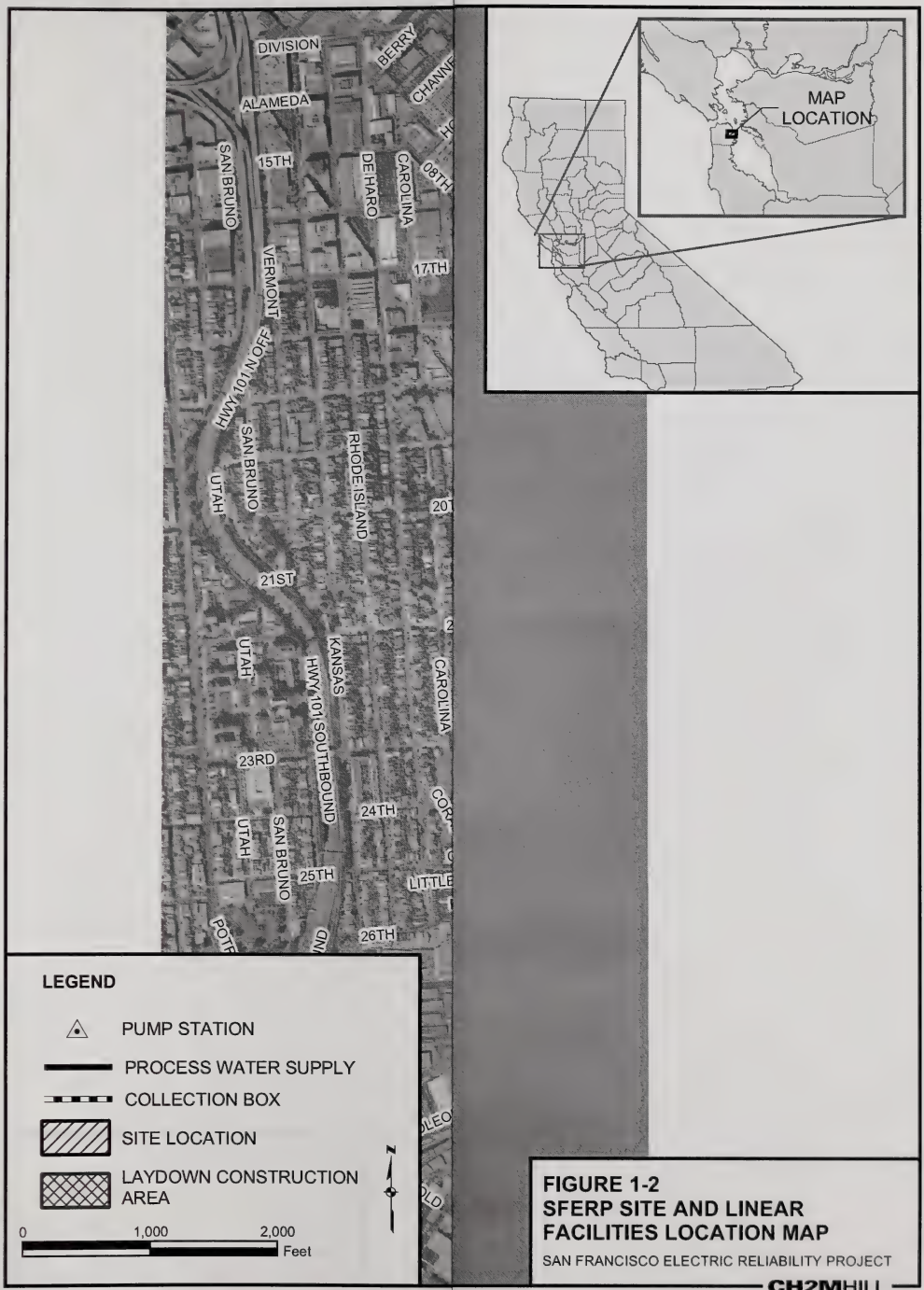


FIGURE 1-2
SFERP SITE AND LINEAR FACILITIES LOCATION MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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FIGURE 1-2
SFERP SITE AND LINEAR FACILITIES LOCATION MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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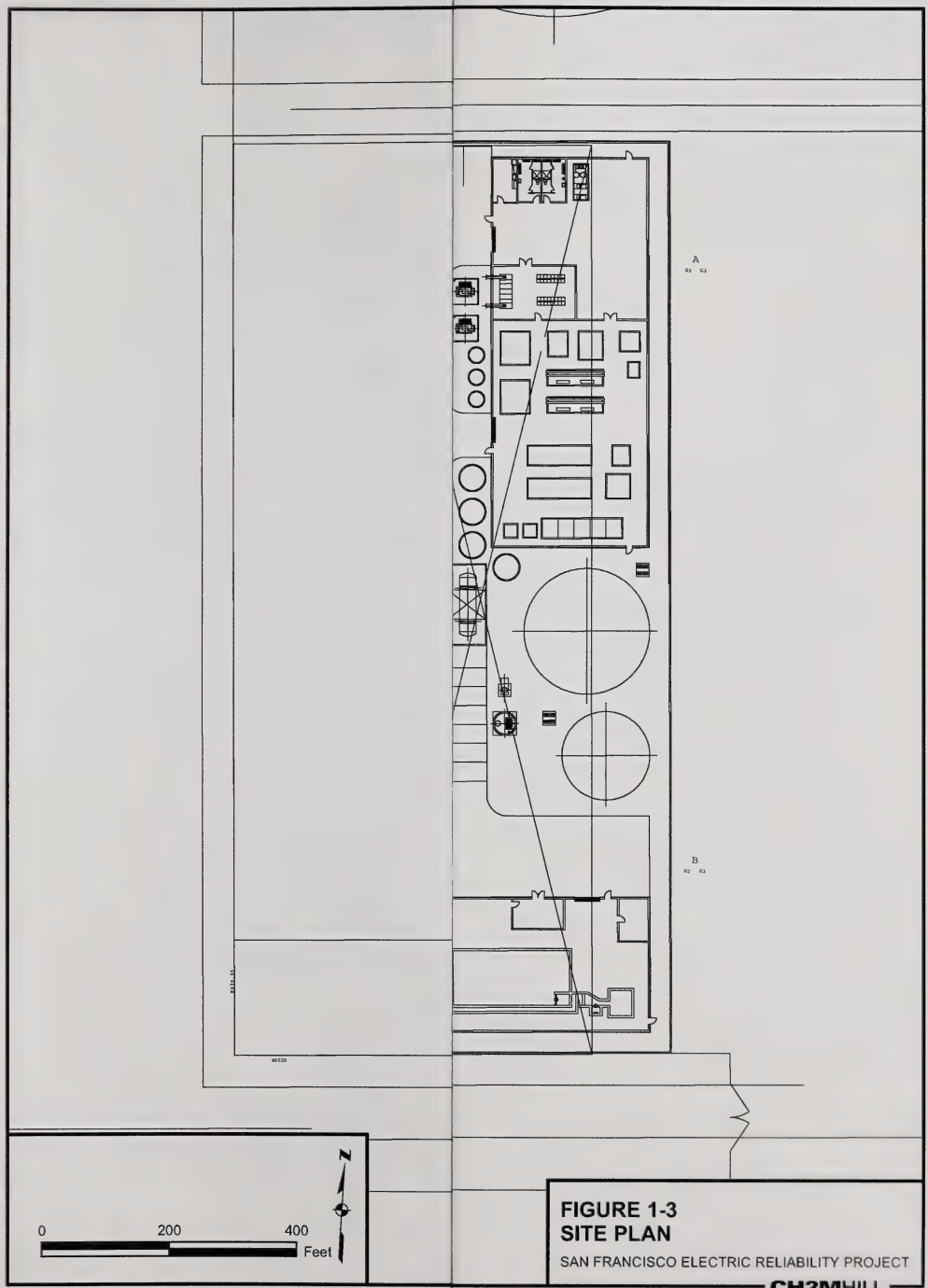


FIGURE 1-3
SITE PLAN
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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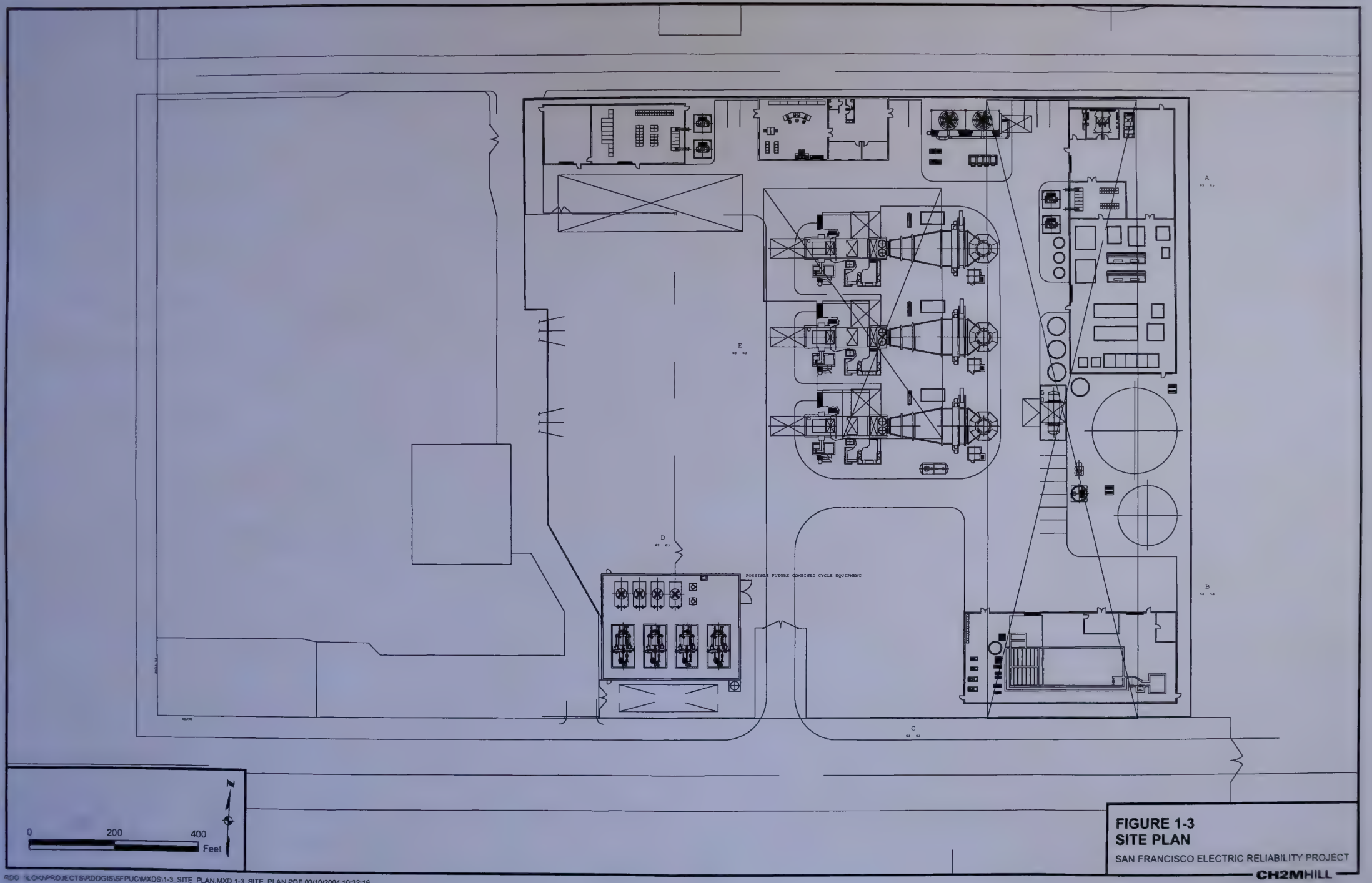


FIGURE 1-3
SITE PLAN
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
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GEND:

LM6000 COMBUSTION TURBINE GENERATOR	43 TREATED WATER STORAGE TANK
TURBINE REMOVAL/MAINTENANCE AREA	44 OIL/WATER SEPARATOR (UG)
CTG AIR INTAKE FILTER SYSTEM	45 WASTE WATER SUMP AND LIFT STATION
GENERATOR ROTOR REMOVAL AREA	46 DI WATER PUMPS
CTG FIRE PROTECTION SKID	47 DI WATER STORAGE TANK
GENERATOR BREAKER SWITCHGEAR	48 TURBINE WASH WATER DRAIN TANK (UG)
SPRINT SYSTEM SKID	49 NATURAL GAS INLET SCRUBBER
NOx WATER INJECTION SKID	50 HYDROCARBON DRAIN TANK
AUXILIARY SKID	51 DISCHARGE FILTER SCRUBBER (TYP. 2)
SCR/CO CATALYST SYSTEM	52 FUEL GAS COMPRESSOR (TYP. 4)
AMMONIA FLOW BALANCE SKID	53 FUEL GAS COOLING RADIATOR (TYP.4)
AMMONIA VAPORIZATION SKID	54 13.8kV/115kV GSU (TYP. 4)
STACK	55 5kV AUXILIARY TRANSFORMER (TYP. 2)
CEMS	56 115 kV BREAKER (TYP.5)
DUPLEX CHILLER/COOLING TOWER PACKAGE	57 115kV SWITCH (TYP. 10)
AUXILIARY COOLING PUMPS	58 FIRE/BLAST WALL (TYP.)
COOLING TOWER CHEMICAL SYSTEM	59 5kV SWITCHGEAR
LUNCH/BREAK ROOM	60 BATTERIES
MEN'S LOCKERS/SHOWERS	61 480V SWITCHGEAR
WOMEN'S LOCKERS/SHOWERS	62 480V MCC'S
PLANT AIR COMPRESSOR PACKAGE	63 480V STATION SERVICE TRANSFORMERS
BULK CAUSTIC STORAGE (IF REQUIRED)	64 EXISTING RETAINING WALL
BULK ACID STORAGE (IF REQUIRED)	65 NEW RETAINING WALL
BULK SODIUM HYPOCHLORITE TANK	66 SWITCHYARD BUSWORK
EDI TRAIN	67 RECLAIMED WATER TREATMENT BLDG
EDI FEED PUMP SKID	68 SUPLEMENTAL AERATION BLOWERS
RO CLEAN IN PLACE SKID	69 MEMBRANE AIR SCOUR BLOWERS
RO FEED PUMP SKID	70 DRAIN PUMP
RO TRAINS	71 PERMEATE PUMP (TYP. 2)
RO CARTRIDGE FILTERS	72 MIXED LIQUOR RECIRCULATION PUMPS
ULTRA FILTRATION SYSTEM WASTE SKID	73 CIP/BACKPULSE PUMPS
ULTRA FILTRATION SYSTEM TRAINS	74 CIP/BACKPULSE TANK
ULTRA FILTRATION SYSTEM PUMP SKID	75 DIP TANK RECIRC/DRAIN PUMPS
AIR BLOWERS	76 DIP TANKS
CHEMICAL METERING SYSTEMS	77 CASSETTE LAYDOWN AREA
EQUALIZATION TANK	78 MEMBRANE TANKS
BIO REACTOR	79 AEROBIC ZONE
ULTRA FILTRATION PERMEATE TANK	80 CHEMICAL FEED/STORAGE ROOM
AQUEOUS AMMONIA FORWARDING PUMPS	81 FEED CHANNEL
AQUEOUS AMMONIA STORAGE TANK	82 COMBINED INLET SYSTEM
RO PERMEATE TANK	83 OFFICE/CONTROL ROOM
TREATED WATER PUMPS	

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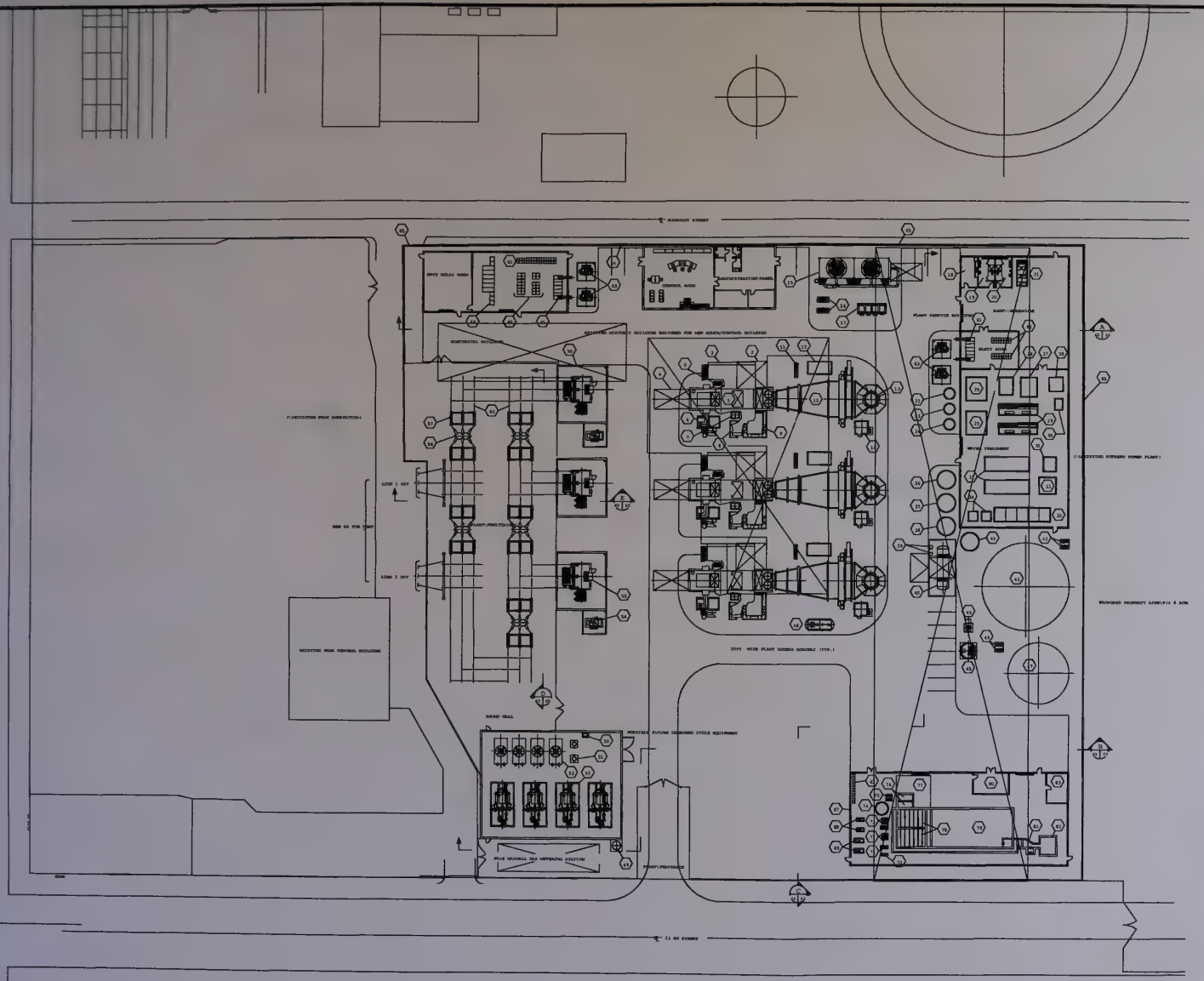
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FIGURE 1-4
SITE LAYOUT

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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LEGEND:

1. LM6000 COMBUSTION TURBINE GENERATOR
2. TURBINE REMOVAL/MAINTENANCE AREA
3. CTG AIR INTAKE FILTER SYSTEM
4. GENERATOR ROTOR REMOVAL AREA
5. CTG FIRE PROTECTION SKID
6. GENERATOR BREAKER SWITCHGEAR
7. SPRINT SYSTEM SKID
8. NOx WATER INJECTION SKID
9. AUXILIARY SKID
10. SCR/CO CATALYST SYSTEM
11. AMMONIA FLOW BALANCE SKID
12. AMMONIA VAPORIZATION SKID
13. STACK
14. CEMS
15. DUPLEX CHILLER/COOLING TOWER PACKAGE
16. AUXILIARY COOLING PUMPS
17. COOLING TOWER CHEMICAL SYSTEM
18. LUNCH/BREAK ROOM
19. MEN'S LOCKERS/SHOWERS
20. WOMEN'S LOCKERS/SHOWERS
21. PLANT AIR COMPRESSOR PACKAGE
22. BULK CAUSTIC STORAGE (IF REQUIRED)
23. BULK ACID STORAGE (IF REQUIRED)
24. BULK SODIUM HYPOCHLORITE TANK
25. EDI TRAIN
26. EDI FEED PUMP SKID
27. RO CLEAN IN PLACE SKID
28. RO FEED PUMP SKID
29. RO TRAINS
30. RO CARTRIDGE FILTERS
31. ULTRA FILTRATION SYSTEM WASTE SKID
32. ULTRA FILTRATION SYSTEM TRAINS
33. ULTRA FILTRATION SYSTEM PUMP SKID
34. AIR BLOWERS
35. CHEMICAL METERING SYSTEMS
36. EQUALIZATION TANK
37. BIO REACTOR
38. ULTRA FILTRATION PERMEATE TANK
39. AQUEOUS AMMONIA FORWARDING PUMPS
40. AQUEOUS AMMONIA STORAGE TANK
41. RO PERMEATE TANK
42. TREATED WATER PUMPS
43. TREATED WATER STORAGE TANK
44. OIL/WATER SEPARATOR
45. WASTE WATER SUMP AND LIFT STATION
46. DI WATER PUMPS
47. DI WATER STORAGE TANK
48. TURBINE WASH WATER DRAIN TANK
49. NATURAL GAS INLET SCRUBBER
50. HYDROCARBON DRAIN TANK
51. DISCHARGE FILTER SCRUBBER (TYP. 2
52. FUEL GAS COMPRESSOR (TYP. 4
53. FUEL GAS COOLING RADIATOR (TYP 4
54. 13.8kV/115kV GSU (TYP. 4
55. 5kV AUXILIARY TRANSFORMER (TYP. 2
56. 115 kV BREAKER (TYP 5
57. 115kV SWITCH (TYP. 10.
58. FIRE/BLAST WALL (TYP.
59. 5kV SWITCHGEAR
60. BATTERIES
61. 480V SWITCHGEAR
62. 480V MCC'S
63. 480V STATION SERVICE TRANSFORMERS
64. EXISTING RETAINING WALL
65. NEW RETAINING WALL
66. SWITCHYARD BUSWORK
67. RECLAIMED WATER TREATMENT BLDG
68. SUPPLEMENTAL AERATION BLOWERS
69. MEMBRANE AIR SCOUR BLOWERS
70. DRAIN PUMP
71. PERMEATE PUMP (TYP. 2)
72. MIXED LIQUOR RECIRCULATION PUMPS
73. CIP/BACKPULSE PUMPS
74. CIP/BACKPULSE TANK
75. DIP TANK RECIRC DRAIN PUMPS
76. DIP TANKS
77. CASSETTE LAYDOWN AREA
78. MEMBRANE TANKS
79. AEROBIC ZONE
80. CHEMICAL FEED/STORAGE ROOM
81. FEED CHANNEL
82. COMBINED INLET SYSTEM
83. OFFICE CONTROL ROOM

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FIGURE 1-4
SITE LAYOUT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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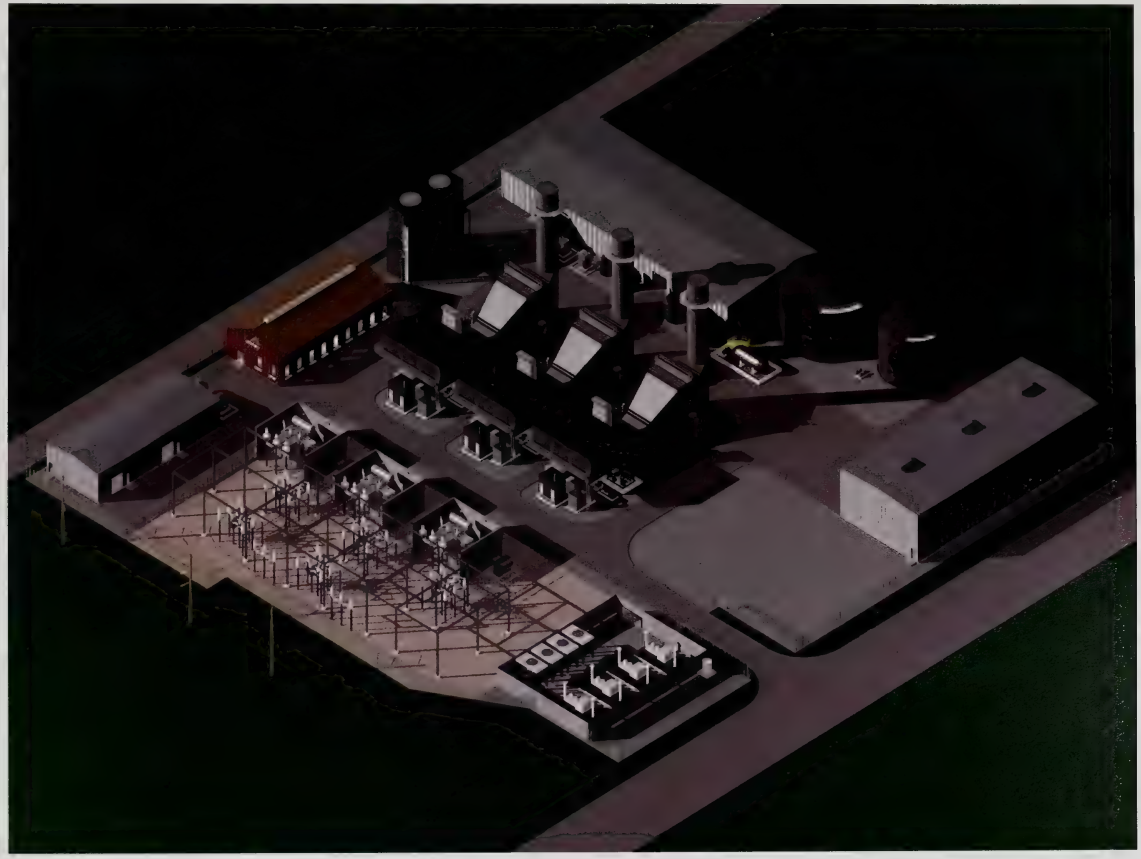


FIGURE 1-5
OBLIQUE VIEW OF PROJECT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SECTION 2.0

Project Description

SECTION 2.0

Project Description

The City of San Francisco (City) is proposing to construct and operate a simple-cycle power plant, the San Francisco Electric Reliability Project (SFERP), in the City and County of San Francisco (CCSF).

2.1 Introduction

The SFERP will consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired LM 6000 gas turbines and associated infrastructure. The project site is located adjacent to the San Francisco Bay in the Potrero District of San Francisco, within the existing site for the Potrero Power Plant (Potrero PP), formerly owned by PG&E and now owned and operated by Mirant Potrero, LLC. The SFERP will be located on a 4.5-acre portion of the previously proposed Mirant Unit 7 site (see Figure 2-1).

The project will include the construction of a new air-insulated 115-kilovolt (kV) switchyard on the west side of the site. A pipeline tie-in will be made to an existing PG&E San Francisco natural gas load center located adjacent to the PG&E Potrero Substation. Process water for the project would be obtained via a water pump station (WPS) located on Marin Street near Cesar Chavez Avenue to a new recycled water system located on the southern portion of the project site, adjacent to 23rd Street.

Electrical generation will be at 13.8 kV, which will be stepped up with 115-kV step-up transformers. The transmission line will interconnect the facility with PG&E's existing 115-kV Potrero Substation located adjacent to the plant site on its western boundary. A new overhead transmission line will interconnect the adjacent PG&E substation to the plant switchyard.

Natural gas for the facility will be delivered through a new 250-foot-long, 12-inch-diameter (or less) pipeline that will connect to PG&E's San Francisco Load Center, which is located on the western portion of the PG&E Potrero Substation. This service will be connected to a booster compressor station that will be part of the SFERP facility.

The City will provide combined sanitary effluent from the WPS to the SFERP for onsite treatment. The WPS will be located in an existing combined sewer system structure and will include three variable frequency drive pumps (two operational and one standby). A one-mile long pipeline will connect the WPS and the SFERP's onsite treatment system. The mile-long pipeline consists of two parts. Approximately 1,300 feet of the pipeline will be installed within an existing collection box. The remaining portion will be new construction (Figure 2-1). The onsite treatment system will be designed to produce Title 22 quality recycled water.

Plant wastewater and reject water from the SFERP wastewater treatment system will be discharged into the City's combined sewer system, which routes the waste to the City of San Francisco Southeast Water Pollution Control Plant (SEWPCP).

Stormwater will be collected onsite during operations and will be directed to existing manholes in the combined sewer system.

The plant's design will incorporate air pollution emission controls designed to meet the stringent standards required by the State and the Bay Area Air Quality Management District. These controls will include water injection for the combustion turbines, a selective catalytic reduction system (SCR) to control oxides of nitrogen emissions, and an oxidation catalyst system to control carbon monoxide and precursor organic compound emissions.

Site access will be provided via existing access roads located at the southern (23rd Street) and northern (Humboldt Street) sides of the Potrero PP. The plant will be accessed from 23rd Street via Illinois Street, with vicinity access via Interstate 280 (I-280).

Property for SFERP is approximately 4.5 acres. The City is in negotiations with Mirant for an option to purchase the property. Additional information on ownership and location is presented in Section 1.

The following sections describe the design and operation of the project and the associated electric transmission line, natural gas supply line, and water lines. Site selection and the alternative sites considered are presented in Section 9, Alternatives.

2.2 Project Description, Design, and Operation

This section describes the facility's conceptual design and proposed operation.

2.2.1 Site Plan and Access

The site arrangement shown in Figure 2-2 and the typical elevation views presented in Figure 2-3 illustrate the location and size of the proposed facility. Approximately 4.5 fenced acres will be required to accommodate the generation facilities. The construction laydown area will be approximately 10 acres, located on land leased from the Port of San Francisco. The laydown area is located between 25th and Cesar Chavez streets, and Water Front and Georgia Streets (see Figure 2-1).

The plant site is currently part of the Potrero PP with numerous abandoned power plant buildings. The power plant equipment has been removed from the buildings and two of the three buildings located on the proposed site are no longer structurally sound. The timing and responsibility for the demolition of these structures is uncertain at this time. However, the City has included the impacts from the demolition of two of these structures and retrofitting of the other in this assessment in order to present the worst-case impacts associated with the project.

2.2.2 Process Description

The project will consist of three General Electric LM 6000 Sprint Combustion Turbine Generators (CTGs) equipped with water injection to control oxides of nitrogen (NO_x) emissions, and power augmentation. SCR will be used for further NO_x control. An oxidation catalyst and associated support equipment are also provided.

Each CTG will generate a nominal 48 MW with the use of chillers. The project is expected to have an overall annual availability approaching 100 percent. The heat and water balances for the facility are shown in Figures 2-4 and 2-5.

Associated equipment will include a 2-cell cooling tower for the inlet air chillers and emission control systems necessary to meet the proposed emission limits. NO_x emissions will be controlled to 2.5 parts per million by volume, dry (ppmvd) basis corrected to 15 percent oxygen by a combination of water injection in the CTGs and SCR systems in the exhaust stack transition. Carbon monoxide (CO) will be controlled to 4 ppmvd at 15 percent oxygen in the CTG combustors with an oxidation catalyst system. Precursor organic compound (POC) emissions will be controlled to 2 ppmvd at 15 percent oxygen.

2.2.3 Plant Cycle

CTG combustion air will flow through the inlet air filters and chiller coils (and associated air inlet ductwork), be compressed, and then flow to the CTG combustion sections. Natural gas fuel will be injected into the compressed air in the combustion sections and ignited. The hot combustion gases will expand through the turbine sections of the CTGs, causing them to rotate and drive the electric generators and CTG compressors. The hot combustion gases will exit the turbine sections, enter a transition that will house the SCR and oxidation catalyst systems, and exit to the atmosphere through the exhaust stacks.

2.2.4 Combustion Turbine Generators

Thermal energy will be produced in the three CTGs through the combustion of natural gas, which will be converted into the mechanical energy required to drive the combustion turbine compressors and electric generators. Three aeroderivative technology CTGs have been selected for the project. General Electric will supply these CTGs. This technology is the most efficient simple-cycle aeroderivative CTG on the market and has a documented availability record of 97.8 percent. The construction and commissioning process for the plant will take approximately 12 to 14 months.

Each CTG system will consist of a CTG with supporting systems and associated auxiliary equipment. The CTGs will have water injection for controlling NO_x emissions and for power augmentation; CTG exhaust emissions will be further reduced through the use of SCR and oxidation catalyst systems.

The CTGs will be equipped with the following required accessories to provide safe and reliable operation:

- Inlet air chilling
- Inlet air filters
- Metal acoustical enclosure
- Lube oil cooler
- Water injection system
- Turbine enclosure vent fans
- Generator enclosure vent fans
- Fire detection and protection system

Inlet combustion air will be cooled via a chilled water system. The combustion turbine also will have water injection spray evaporative inter-cooling between the low-pressure compressor. NO_x suppression water injection will control NO_x emissions at the outlet of the CTG.

The exhaust stack transition will be equipped with an SCR emission control system that will use ammonia vapor in the presence of a catalyst to further reduce the NO_x concentration in the exhaust gases. The catalyst module will be located between the CTG exhaust gas transition section and the exhaust stack base. Diluted ammonia vapor (NH_3) will be injected into the exhaust gas stream through a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction will reduce NO_x to nitrogen and water, resulting in a NO_x concentration of no more than 2.5 ppmvd at 15 percent oxygen in the exhaust gas. The exhaust stack transition will also include an oxidation catalyst system, which will control CO emissions to 4 ppmvd. POC emissions will be controlled to less than 2 ppmvd. The oxidation catalyst system will be located in the ductwork between the CTG and the SCR system.

2.2.5 Major Electrical Equipment and Systems

2.2.5.1 AC Power—Transmission

Three CTGs will generate power at 13.8 kV. An overall single-line diagram of the facility's electrical system is shown in Figure 2-6. The three 13.8-kV generator outputs will be connected by generator bus to individual oil-filled generator step-up transformers, which will increase the voltage to 115-kV. Surge arresters will be provided at the high-voltage bushings to protect the transformers from surges on the 115-kV system caused by lightning strikes or other system disturbances. The transformers will be set on concrete pads within containment systems designed to contain the transformer oil (non-polychlorinated biphenyl [PCB]) in case of a leak or spill. Rated fire barriers will be used to separate critical equipment and to provide fire protection. The high voltage side of each step-up transformer will be connected to PG&E's Potrero 115-kV Substation via an open air 115-kV switchyard located on the project site. The switchyard will be configured in a highly reliable scheme, as detailed in Section 5.0.

2.2.5.2 AC Power—Distribution to Auxiliaries

Auxiliary power to the combustion turbine power block will be supplied at 4,160 volts alternating current (AC) by a double-ended 4,160-volt (4.16 kV) switchgear lineup. Two non-PCB oil-filled 115 to 4.16-kV station service stepdown transformers will supply primary power to the switchgear.

The 4,160-volt switchgear lineup will supply power to the CTG inlet chiller compressor motors, the natural gas compressors, and to the load center (LC) transformers, and will be rated at 4,160 to 480 volts for 480-volt power distribution.

2.2.5.3 DC Power Supply

Each CTG comes equipped with 125-volts direct current (DC) battery/charger systems for its package control system and an on-board fire protection system. The required 480-volt AC power supply will be provided from the associated motor control center (MCC) for each CTG.

One common DC power supply system consisting of a 125-volt DC battery, two 100 percent 125-volt DC full-capacity battery chargers, metering, ground detectors, and distribution panels will be supplied for the balance-of-plant.

Under normal operating conditions, the battery chargers will supply DC power to the DC loads. The battery chargers will receive 480-volt, three-phase AC power from the AC power supply (480-volt) system and continuously charge the batteries while supplying power to the DC loads. The ground detection scheme will detect grounds faults on the DC power supply system.

Under abnormal or emergency conditions, when power from the AC power supply (480-volt) system is unavailable, the battery will supply DC power to the DC loads. Recharging of a discharged battery will occur whenever 480-volt power becomes available from the AC power supply (480-volt) system. The rate of charge will depend on the characteristics of the battery, battery charger, and connected DC load during charging. The anticipated maximum recharge time will be 24 hours.

The 125-volt DC system will also be used to provide control power to the 4,160-volt switchgear, to the 480-volt LCs, and to critical control circuits.

2.2.5.4 Essential Service AC Uninterruptible Power Supply

The combustion turbine power block will also have an essential service 120-volt AC, single-phase, 60-hertz (Hz) power source. This source will supply AC power to essential instrumentation, to critical equipment loads, and to unit protection and safety systems that require uninterruptible AC power. The essential service AC system and DC power supply system will be designed to ensure that critical safety and unit protection control circuits have power and can take the correct action on a unit trip or loss of plant AC power.

The essential service AC system will consist of one full-capacity inverter, a solid-state transfer switch, a manual bypass switch, an alternate source transformer and voltage regulator, and an AC panel board.

The normal source of power to the system will be the DC power supply system through the inverter to the panel board. A solid-state static transfer switch will monitor the inverter output and the alternate AC source continuously. The transfer switch will automatically transfer essential AC loads without interruption from the inverter output to the alternate source upon loss of the inverter output.

A manual bypass switch will also be included to enable isolation of the inverter-static transfer switch for testing and maintenance without interruption to the essential service AC loads.

2.2.6 Fuel System

The CTGs will be designed to burn natural gas. Maximum natural gas requirements during operation are approximately 35,150 million British thermal units per day (MBtus/day) higher heating value (HHV) basis.

The pressure of natural gas delivered to the site via PG&E is expected to be approximately 110 pounds per square inch gauge (psig). The natural gas will be boosted to approximately

690 psig by onsite compressors, and then flow through a gas pressure control station and gas scrubber/filtering equipment, before entering the combustion turbines.

2.2.7 Water Supply and Use

This section describes the quantity of water required and the use of the water supply.

2.2.7.1 Water Requirements

Water consumption includes a cooling tower makeup for cooling from the following heat rejection sources: CTG lube oil system, inlet air chiller condenser, and other minor sources. Additional makeup water is fed to the water treatment system for use in NO_x suppression injection and compressor evaporative cooling. The project's expected peak water consumption is about 362 gallons per minute (gpm) based on full load operation on a hot day. At this rate, total daily peak water use is about 520,000 gallons per day (gpd), based on 24 hours of operation at the sustained peak hourly temperature.

Generation of demineralized water quality is required to operate the CTG water treatment system. Water filtration and demineralization equipment will be provided to produce and store deionized (DI) water for distribution to the turbines, as required.

2.2.7.2 Water Supply

Approximately 57 percent of the total water requirements for the project will be for water injection to control NO_x emissions and compressor evaporative cooling. The balance of the water will be used in the cooling towers as makeup, for cooling tower blowdown, and for reject from the water treatment system. Process water will be supplied via a WPS located on Marin Street near Cesar Chavez Street. The WPS will convey process water to the new SFERP recycled water treatment system.

The SFERP will be supplied with potable water via a potable water pipeline located in 23rd Street. A short (approximately 50-foot) supply pipeline will be connected to the SFERP. SFERP will use potable water for domestic uses, and as an emergency cooling and process backup water supply for the project.

2.2.7.3 Water Treatment

Process water will be provided to the SFERP via a 1-mile-long underground pipeline, where it will be treated to Title 22 recycled water standards by an onsite treatment system that will include primary, secondary, and tertiary treatment. The primary treatment of the process supply water will be accomplished by use of a traveling band screen constructed of stainless steel perforated plates. Solids will be sluiced from the screen by a water wash system and will be returned to the combined sewer system located in 23rd Street. The secondary treatment will be achieved in an anoxic/aerobic tank to ensure proper biological activity. After the appropriate hydraulic retention time, the water will flow into the tertiary treatment system. The tertiary treatment and filtering will be achieved by incorporation of a Membrane BioReactor (MBR) (Zenon or other similar process). An aerobic zone is created and scouring of the membrane fibers is achieved by the introduction of scouring air through a series of diffusers. The filtered permeate will then be disinfected with an ultraviolet or chlorinated system, depending upon the final design parameters. The recycled water will then be pumped to the recycled water storage tank for use within the plant for all non-

potable water applications. A small waste stream containing the MBR-collected solids will be sent to the combined sewer located in 23rd Street. All equipment open to the atmosphere will be vented through an activated carbon collection system to control odors.

The treated water will be divided into supply for the cooling towers and supply for NO_x suppression injection and compressor evaporative cooling. Cooling water treatment may require the addition of chemicals such as a pH control agent (acid or caustic), a mineral scale dispersant (e.g., polyacrylate polymer), a corrosion inhibitor (phosphate based), and a biocide (hypochlorite or equivalent). No chromium-based additives will be used in the cooling water.

The water to be used for NO_x suppression injection and compressor evaporative cooling will be treated beginning with a reverse osmosis (RO) system. The RO product, or permeate, is then fed to an electrodeionization (EDI) system to reduce any remaining ions to the required concentrations for feed into the turbine. Product water from the EDI system will be stored in the DI water storage tank.

Discharges from the water treatment processes and plant wastewater will be sent to the SEWPCP via the combined sewer system.

2.2.8 Plant Cooling Systems

The heat rejection system will consist of a single two-cell wet counter flow cooling tower to remove the heat generated by the turbine inlet chillers and the heat generated by miscellaneous auxiliary heat loads such as lube oil coolers. The cooling tower cells will use treated water as makeup and will have a continuous blowdown to maintain basin dissolved solids in the range of 5 cycles of concentration.

2.2.9 Waste Management

Waste management is the process whereby all wastes produced at the plant will be collected, treated if necessary, and disposed of properly. Wastes will include waste lubricating oils and oily rags. Waste management is discussed in more detail in Subsection 8.13.

2.2.9.1 Solid Waste

The project will produce minimal maintenance and plant wastes typical of power generation operations. Maintenance will be performed by an outside contractor. The contractor will remove all generated wastes to the contractor's establishment for ultimate disposal. Generation plant wastes include: oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers.

2.2.9.2 Hazardous Wastes

Several methods will be used to properly manage and dispose of hazardous wastes generated by the project. Waste lubricating oil will be recovered and recycled by a waste oil-recycling contractor. Spent lubrication oil filters will be disposed of by the maintenance contractor in a Class I landfill. Spent SCR catalysts will be recycled by the supplier.

2.2.9.3 Wastewater Discharge

Wastewater from the water treatment process, cooling/process water blowdown, and sanitary sewer discharges will be sent to the SEWPCP via the combined sewer system. The interconnection to the combined sewer system will be located in 23rd Street, on the south side of the project site.

2.2.10 Management of Hazardous Materials

There will be a variety of chemicals stored and used during construction and operation of SFERP. The storage, handling, and use of all chemicals will be conducted in accordance with applicable laws, ordinances, regulations, and standards (LORS). Chemicals will be stored in appropriate chemical storage facilities, bulk chemicals will be stored in storage tanks, and most other chemicals will be stored in returnable delivery containers. Chemical storage and chemical feed areas will be designed to contain leaks and spills. Berm and drain piping design will allow a full-tank capacity spill without overflowing the berms. For multiple tanks located within the same bermed area, the capacity of the largest single tank will determine the volume of the bermed area and drain piping. Drain piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious or toxic vapors. After neutralization, if required, water collected from the chemical storage areas will be directed to the cooling tower basin.

A 29 percent solution of aqueous ammonia will be stored in a tank with a containment basin and collection sump.

Portable safety showers and eyewashes will be provided adjacent to the ammonia storage tank area. State-approved personal protective equipment (PPE) will be used by maintenance personnel during chemical spill containment and cleanup activities. Personnel will be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material will be stored onsite for spill cleanup.

Electric equipment insulating materials will be specified to be free of PCBs.

A list of the chemicals anticipated for use at the facility is provided in Subsection 8.12, Hazardous Materials Handling. Table 8.12-3 identifies each chemical by type and intended use and estimates the quantity to be stored onsite. Subsection 8.12 includes additional information on hazardous materials handling.

2.2.11 Emission Control and Monitoring

Air emissions from the combustion of natural gas in the CTGs will be controlled using state-of-the-art systems. Subsection 8.1, Air Quality, includes additional information on emission control and monitoring, which is summarized below. The air emission rates for the CTGs are summarized in Subsection 2.2.15, Facility Operation.

2.2.11.1 NO_x Emission Control

Water injection and SCR will be used to control NO_x concentrations in the exhaust gas emitted to the atmosphere to 2.5 ppmvd at 15 percent oxygen from the gas turbines. The SCR process will use a 29 percent solution of aqueous ammonia. Ammonia slip, or the

concentration of unreacted ammonia in the exiting exhaust gas, will be limited to 10 ppmvd at 15 percent oxygen. The SCR equipment will include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors.

2.2.11.2 CO and POC Emission Control

CO will be controlled at the CTG combustor with state-of-the-art combustion technology and the use of an oxidation catalyst system. POC emissions will be controlled with advanced combustion controls and the oxidation catalyst system.

2.2.11.3 Particulate Emission Control

Particulate emissions will be controlled using good combustion controls and natural gas as the sole fuel for the CTGs.

2.2.11.4 Continuous Emission Monitoring

A monitoring system will record fuel gas flow rate and monitor the emissions of NO_x, CO, and oxygen in the exhaust gas. This system will generate reports of emissions data in accordance with permit requirements and will send alarm signals to the control room when the level of emissions approaches or exceeds pre-selected limits.

2.2.12 Plant Auxiliaries

The following systems will support, protect, and control the generating facility.

2.2.12.1 Lighting

The lighting system will provide maintenance personnel with illumination under normal conditions. As the generation equipment is located inside a metal enclosure with wide access doors, egress under emergency conditions will not require emergency lighting. The system also will provide 120-volt convenience outlets for portable lamps and tools.

2.2.12.2 Grounding

The electrical system will be susceptible to ground faults, lightning, and switching surges that can result in high voltage—a potential hazard to site personnel and electrical equipment. The station grounding system will provide an adequate path to permit the dissipation of current created by these events.

2.2.12.3 Distributed Control and Information System

The Distributed Control and Information System (DCIS) will provide modulating control, digital control, monitoring, and indicating functions for the plant power block systems. The following functions will be provided:

- Controlling the CTGs and other systems in a coordinated manner
- Controlling the balance-of-plant systems in response to plant demands
- Monitoring controlled plant equipment and process parameters and delivering this information to plant operators

- Providing control displays (printed logs, cathode ray tube [CRT]) for signals generated within the system or received from input/output (I/O)
- Providing consolidated plant process status information through displays presented in a timely and meaningful way
- Providing alarms for out-of-limit parameters or parameter trends, displaying on alarm CRT(s), and recording on an alarm log printer
- Storing and retrieving historical data

The DCIS will be a redundant microprocessor-based system consisting of the following major components:

- CRT-based operator consoles
- Engineer work station
- Distributed processing units
- I/O cabinets
- Historical data unit
- Printers
- Data links to the combustion turbine and steam turbine control systems

2.2.12.4 Cathodic Protection

The cathodic protection system will be designed to control the electrochemical corrosion of designated metal piping buried in the soil. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection will be provided.

2.2.13 Interconnect to Electrical Grid

Each of the three CTGs will be connected to a 3-phase step-up transformer, which will be connected to the plant's 115-kV switchyard. The switchyard will consist of an open air switchyard arranged in the highly-reliable scheme with appropriate disconnect switches, circuit breakers, and grounding switches. From the switchyard, the generated power will be transmitted into PG&E's Potrero 115-kV Substation via overhead 115-kV transmission line. See Section 5.0 for additional information on the switchyard and connection to the PG&E transmission system.

2.2.14 Project Construction

Construction of the generating facility—from demolition (if applicable), site preparation and grading, to commercial operation—is expected to take approximately 12 to 14 months. Major milestones are listed in Table 2-1.

TABLE 2-1
Project Schedule Major Milestones

Activity	Date
Begin /Demolition	Second Quarter 2005
Startup and Test	Second Quarter 2006
Commercial Operation	Second Quarter 2006

The site will be accessed for construction via the Potrero PP access road (i.e., Humboldt Street) and 23rd Street.

The workforce on the project during construction will be approximately 250 people, including construction craft persons and supervisory, support, and construction management personnel (see Subsection 8.8, Socioeconomics).

Normal construction will be scheduled between 7 a.m. and 8 p.m., Monday through Friday. During construction and startup of the project, some activities may continue 24 hours per day, 7 days per week.

2.2.15 Facility Operation

The Applicant intends to operate the facility 24 hours per day, 7 days per week, for up to 12,000 hours per year total for the 3 combustion turbines. The air emissions associated with the operation of the SFERP are presented in Table 2-2.

TABLE 2-2
Air Emission Rates for the Combustion Turbines and Cooling Tower

Pollutant	Parts per Million by Volume @ 15% O_2	Pounds per Hour	Tons per Year
NO_x	2.5[a]	4.41	39.8
SO2[b]	0.15	0.45	2.7
CO	4.0[a]	4.30	27.9
POC	2.0[a]	1.23	7.7
PM_{10}/ $PM_{2.5}$	n/a	3.0	18.2[c]

Notes:
[a] NOx, CO, and POC emission rates exclude startups and shutdowns (see Table 8.1-18).
[b] Based on annual average natural gas sulfur content of 0.33 gr/100 scf.
[c] Includes 0.2 tons per year of PM_{10}/ $PM_{2.5}$ emissions from the cooling tower.

2.3 Facility Safety Design

The facility will be designed to maximize safe operation. Hazards that could affect the facility include earthquake, flood, and fire.

2.3.1 Natural Hazards

The principal natural hazards associated with the site are earthquakes and floods. The site is located in Seismic Risk Zone 4. Structures will be designed to meet the seismic requirements of the California Code of Regulations (CCR) Title 24 and the 2001 California Building Code (CBC). Subsection 8.15, Geologic Hazards and Resources, discusses the geological hazards of the area and site. This section includes a review of potential geologic hazards, seismic ground motions, and the potential for soil liquefaction due to ground shaking. Appendix 10 includes the structural seismic design criteria for the buildings and equipment.

The site is essentially flat, with an average elevation of approximately 26 feet above mean sea level (msl). According to the Federal Emergency Management Agency (FEMA), the site

is not within either the 100- or 500-year floodplain. Subsection 8.14, Water Resources, includes additional information on the potential for flooding.

2.3.2 Emergency Systems and Safety Precautions

This section discusses the fire protection systems and safety precautions to be used by project personnel. Subsection 8.7, Worker Health and Safety, includes additional information on safety for workers. Appendix 10 contains the design practices and codes applicable to safety design for the project. Compliance with these requirements will minimize project effects on public and employee safety.

2.3.2.1 Fire Protection Systems

The project will rely on both onsite fire protection systems and local fire protection services.

2.3.2.1.1 Onsite Fire Protection Systems. The fire protection systems will be designed to protect personnel and limit property loss and plant downtime from fire or explosion. The project will have the following fire protection systems.

CO_2 Fire Protection System. This system will protect the turbine, generator, and accessory equipment compartments from fire. The system will have fire detection sensors in all compartments. Actuating one sensor will provide a high temperature alarm on the combustion turbine control panel. Actuating a second sensor will trip the combustion turbine, turn off ventilation, close ventilation openings, and automatically release the CO_2. The CO_2 will be discharged at a design concentration adequate to extinguish the fire.

Local Fire Protection Services. In the event of a major fire, plant personnel will be able to call upon the San Francisco Fire Department for assistance. The Hazardous Materials Risk Management Plan (see Subsection 8.12, Hazardous Materials Handling) for the plant will include all information necessary to permit firefighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies.

2.3.2.2 Personnel Safety Program

The project will operate in compliance with federal and state occupational safety and health program requirements. Compliance with these programs will minimize project effects on employee safety. These programs are described in Subsection 8.7, Worker Health and Safety.

2.4 Facility Reliability

This section discusses the expected plant availability, equipment redundancy, fuel availability, water availability, and project quality control measures.

2.4.1 Plant Availability

The Applicant intends that this facility is able to operate 24 hours per day, 7 days per week, for up to 12,000 engine hours per year total for the three combustion turbines.

2.4.2 Redundancy of Critical Components

The following subsections identify equipment redundancy as it applies to project availability. Specifically, redundancy in the power block is described. The power block will be served by the following balance-of-plant systems: DCIS, demineralized water system, and closed cycle cooling water system. Redundancy following final design may differ.

2.4.2.1 Power Block

Three separate combustion turbine power generation trains will operate in parallel within the power block. Each train will be powered by a combustion turbine. Each combustion turbine will provide approximately 33 percent of the total power block output. The power block comprises the major components described below.

2.4.2.1.1 CTG Subsystems. The combustion turbine subsystems will include the combustion turbine, inlet air filtration and inlet chilling system, generator and excitation systems, and turbine control and instrumentation. The combustion turbine will produce thermal energy through the combustion of natural gas; the thermal energy will be converted into mechanical energy through rotation of the combustion turbine, which drives the compressor and generator. The CTG generators will be totally enclosed and air-cooled. The generator excitation system will be a solid-state static system. Combustion turbine control and instrumentation (interfaced with the DCIS) will cover the turbine governing system, the protective system, and sequence logic.

2.4.2.2 DCIS

The DCIS will provide the following control, monitoring, and alarm functions for plant systems and equipment:

- Control the CTG and other systems in response to unit load demands (coordinated control)
- Provide control room operator interface
- Monitor plant equipment and process parameters and provide this information to the plant operators in a meaningful format
- Provide visual and audible alarms for abnormal events based on field signals or software generated signals from plant systems, processes, or equipment

2.4.2.3 Demineralized Water System

Water for the demineralized water system will be provided from the onsite recycled water system. The demineralized water system will consist of a RO system followed by an EDI system. Demineralized water will be stored in a suitable water tank.

2.4.2.4 Closed Cooling Water System

The closed cooling water system transfers heat from various plant equipment heat exchangers to the circulating water system through the cooling water heat exchangers. This subsystem includes motor-driven centrifugal pumps and a cooling water heat exchanger.

2.4.3 Fuel Availability

Fuel will be delivered by PG&E from its existing San Francisco Gas Load Center, located west of the project site at the PG&E Substation. Capacity at the Load Center, which is fed by the three natural gas pipelines that supply natural gas to San Francisco, is sufficient to supply the project. Because the project is not designed for a backup fuel supply, it would be shut down in the event natural gas service were interrupted.

2.4.4 Water Availability

The only source of process water for the project will be untreated water from the combined sewer system. The availability of water to meet the needs of the project is discussed in more detail in Section 7, Water Supply, and Subsection 8.14, Water Resources.

2.4.5 Project Quality Control

The objective of the Quality Control Program will be to ensure that all systems and components have the appropriate quality measures applied during design, procurement, fabrication, construction, and operation. The goal of the Quality Control Program is to achieve the desired levels of safety, reliability, availability, operability, constructibility, and maintainability for the generation of electricity.

Assurance of the quality required for a system is obtained by applying appropriate controls to various activities. For example, the appropriate controls for design work are checking and review, and the appropriate controls for manufacturing and construction are inspection and testing. Appropriate controls will be applied to each of the various project activities.

2.4.5.1 Project Stages

For quality assurance planning purposes, project activities have been divided into the following nine stages:

- **Conceptual Design** – Activities such as the definition of requirements and basic engineering analyses.
- **Detail Design** – Activities such as the preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components.
- **Procurement Specification Preparation** – Activities necessary to compile and document the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services.
- **Manufacturer Control and Surveillance** – Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications.
- **Manufacturer Data Review** – Activities required to review manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components and conformance to procurement specifications.
- **Receipt Inspection** – Inspection and review of products upon delivery to the construction site.

- **Construction/Installation** – Inspection and review of storage, installation, and cleaning and initial testing of systems or components at the plant site.
- **System/Component Testing** – Actual controlled operation of electrical generating components in a system to ensure that the performance of systems and components conforms to specified requirements.
- **Plant Operation** – Actual operation of the energy facility system as the project progresses, the design, procurement, fabrication, erection, and checkout of each plant system will progress through the nine stages defined above.

2.4.5.2 Quality Control Records

The following quality control records will be maintained for review and reference:

- Project instructions manual
- Design calculations
- Project design manual
- Quality assurance audit reports
- Conformance to construction records drawings
- Procurement specifications (contract issue and change orders)
- Purchase orders and change orders
- Project correspondence

For procured component purchase orders, a list of qualified suppliers and subcontractors will be developed. Before contracts are awarded, the subcontractors' capabilities will be evaluated. The evaluation will include consideration of suppliers' and subcontractors' personnel, production capability, past performance, and quality assurance program.

During construction, field activities will be accomplished during the last four stages of the project: receipt inspection, construction/installation, system/component testing, and plant operation. The construction contractor will be contractually responsible for performing the work in accordance with the quality requirements specified by contract.

The contractors quality compliance along with that of any subcontractors will be surveyed through inspections, audits, and the administration of independent testing contracts.

An Operation and Maintenance (O&M) program, typical for a project of this size, will be implemented by the City or its maintenance contractor to control the quality of plant O&M. A specific program for this project will be defined and implemented during initial plant startup.

2.5 Laws, Ordinances, Regulations, and Standards

The applicable LORS for each engineering discipline are discussed in Section 10, Engineering, and included as part of the Engineering Appendices (Appendix 10).

2.6 Facility Closure

2.6.1 Introduction

Facility closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, including closure for overhaul or replacement of the combustion turbines. Causes for temporary closure include a disruption in the supply of natural gas or damage to the plant from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations owing to plant age, damage to the plant beyond repair, economic conditions, City policy, or other reasons. Subsection 2.6.2 discusses temporary facility closure; Subsection 2.6.3 discusses permanent facility closure.

2.6.2 Temporary Closure

For a temporary facility closure, where there is no release of hazardous materials, security of the facilities will be maintained on a 24-hour basis, and the California Energy Commission (CEC) and other responsible agencies will be notified. Depending on the length of shutdown necessary, a contingency plan for the temporary cessation of operations will be implemented. The contingency plan will be conducted to ensure conformance with all applicable laws, ordinances, regulations, and standards (LORS) and the protection of public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes will be disposed of according to applicable LORS, as discussed in Subsection 8.13, Waste Management.

Where the temporary closure includes damage to the facility, and there is a release or threatened release of acutely hazardous materials into the environment, procedures will be followed as set forth in a Risk Management Plan (RMP) to be developed as described in Subsection 8.12, Hazardous Materials. Procedures will include methods to control releases, notification of applicable authorities and the public, emergency response, and training for plant personnel in responding to and controlling releases of hazardous materials. Once the immediate problem is solved, and the acutely hazardous materials release is contained and cleaned up, temporary closure will proceed as described above for a closure where there is no release of hazardous materials.

2.6.3 Permanent Closure

The planned life of the generation facility is 30 years. However, if the generation facility were still economically viable and continued operation were still consistent with City policy, it could be operated longer. It is also possible that the facility could become economically noncompetitive earlier than 30 years, or that continued operation of the facility could become inconsistent with City policy within the initial 30 years of operation, forcing early decommissioning. Whenever the facility is permanently closed, the closure procedure will follow a plan that will be developed as described below.

The removal of the facility from service, or decommissioning, may range from "mothballing" to the removal of all equipment and appurtenant facilities, depending on conditions at the time. Because the conditions that would affect the decommissioning

decision are largely unknown at this time, these conditions would be presented to the CEC and the City when more information is available and the timing for decommissioning is imminent.

To ensure that public health and safety and the environment are protected during decommissioning, a decommissioning plan will be submitted to the CEC for approval prior to decommissioning. The plan will discuss the following:

- Proposed decommissioning activities for the facility and all appurtenant facilities constructed as part of the facility
- Conformance of the proposed decommissioning activities to all applicable LORS and local/regional plans
- Activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities
- Decommissioning alternatives other than complete restoration
- Associated costs of the proposed decommissioning and the source of funds to pay for the decommissioning

In general, the decommissioning plan for the facility will attempt to maximize the recycling of all facility components. Unused chemicals will be sold back to the suppliers or other purchasers or users. All equipment containing chemicals will be drained and shut down to ensure public health and safety and to protect the environment. All nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. All hazardous wastes will be disposed of according to all applicable LORS. The site will be secured 24 hours per day during the decommissioning activities.

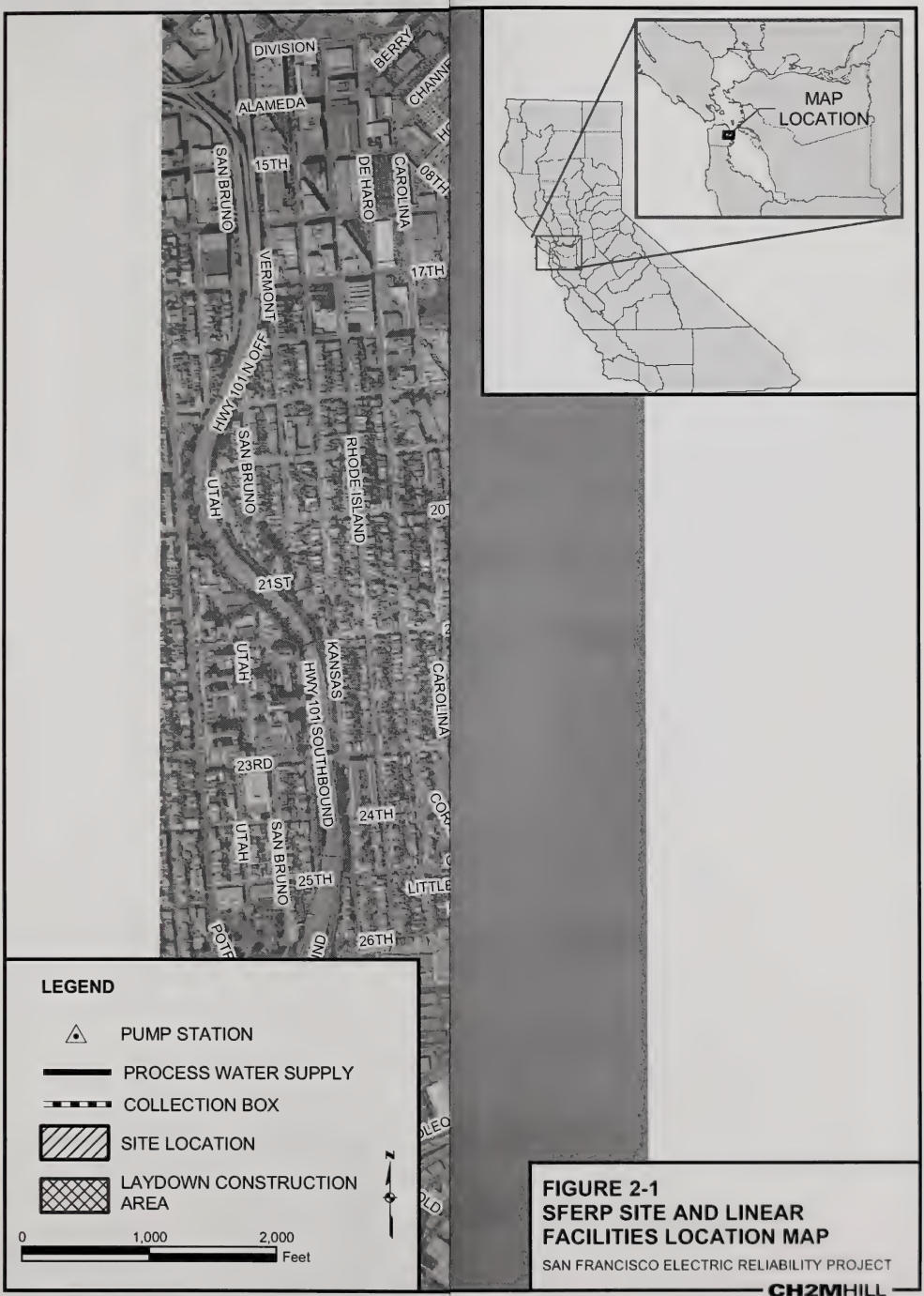


FIGURE 2-1
SFERP SITE AND LINEAR FACILITIES LOCATION MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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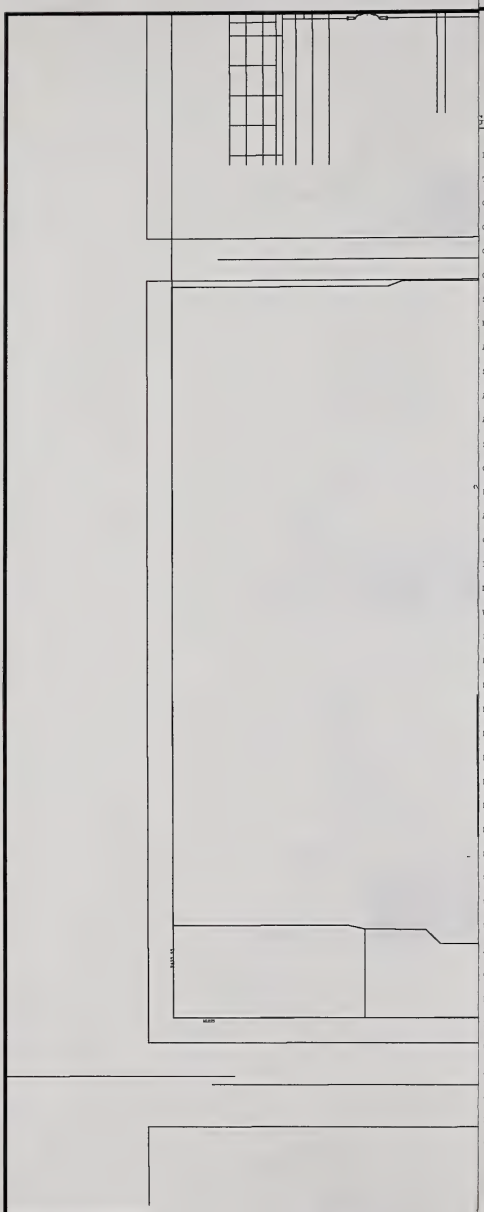
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FIGURE 2-1
SFERP SITE AND LINEAR FACILITIES LOCATION MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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GEND:

	LM6000 COMBUSTION TURBINE GENERATOR	43	TREATED WATER STORAGE TANK
	TURBINE REMOVAL/MAINTENANCE AREA	44	OIL/WATER SEPARATOR (UG)
	CTG AIR INTAKE FILTER SYSTEM	45	WASTE WATER SUMP AND LIFT STATION
	GENERATOR ROTOR REMOVAL AREA	46	DI WATER PUMPS
	CTG FIRE PROTECTION SKID	47	DI WATER STORAGE TANK
	GENERATOR BREAKER SWITCHGEAR	48	TURBINE WASH WATER DRAIN TANK (UG)
	SPRINT SYSTEM SKID	49	NATURAL GAS INLET SCRUBBER
	NOx WATER INJECTION SKID	50	HYDROCARBON DRAIN TANK
	AUXILIARY SKID	51	DISCHARGE FILTER SCRUBBER (TYP. 2)
	SCR/CO CATALYST SYSTEM	52	FUEL GAS COMPRESSOR (TYP. 4)
	AMMONIA FLOW BALANCE SKID	53	FUEL GAS COOLING RADIATOR (TYP.4)
	AMMONIA VAPORIZATION SKID	54	13.8kV/115kV GSU (TYP. 4)
	STACK	55	5KV AUXILIARY TRANSFORMER (TYP. 2)
	CEMS	56	115 kV BREAKER (TYP.5)
	DUPLEX CHILLER/COOLING TOWER PACKAGE	57	115kV SWITCH (TYP. 10)
	AUXILIARY COOLING PUMPS	58	FIRE/BLAST WALL (TYP.)
	COOLING TOWER CHEMICAL SYSTEM	59	5kV SWITCHGEAR
	LUNCH/BREAK ROOM	60	BATTERIES
	MEN'S LOCKERS/SHOWERS	61	480V SWITCHGEAR
	WOMEN'S LOCKERS/SHOWERS	62	480V MCC'S
	PLANT AIR COMPRESSOR PACKAGE	63	480V STATION SERVICE TRANSFORMERS
	BULK CAUSTIC STORAGE (IF REQUIRED)	64	EXISTING RETAINING WALL
	BULK ACID STORAGE (IF REQUIRED)	65	NEW RETAINING WALL
	BULK SODIUM HYPOCHLORITE TANK	66	SWITCHYARD BUSWORK
	EDI TRAIN	67	RECLAIMED WATER TREATMENT BLDG
	EDI FEED PUMP SKID	68	SUPLEMENTAL AERATION BLOWERS
	RO CLEAN IN PLACE SKID	69	MEMBRANE AIR SCOUR BLOWERS
	RO FEED PUMP SKID	70	DRAIN PUMP
	RO TRAINS	71	PERMEATE PUMP (TYP. 2)
	RO CARTRIDGE FILTERS	72	MIXED LIQUOR RECIRCULATION PUMPS
	ULTRA FILTRATION SYSTEM WASTE SKID	73	CIP/BACKPULSE PUMPS
	ULTRA FILTRATION SYSTEM TRAINS	74	CIP/BACKPULSE TANK
	ULTRA FILTRATION SYSTEM PUMP SKID	75	DIP TANK RECIRC/DRAIN PUMPS
	AIR BLOWERS	76	DIP TANKS
	CHEMICAL METERING SYSTEMS	77	CASSETTE LAYDOWN AREA
	EQUALIZATION TANK	78	MEMBRANE TANKS
	BIO REACTOR	79	AEROBIC ZONE
	ULTRA FILTRATION PERMEATE TANK	80	CHEMICAL FEED/STORAGE ROOM
	AQUEOUS AMMONIA FORWARDING PUMPS	81	FEED CHANNEL
	AQUEOUS AMMONIA STORAGE TANK	82	COMBINED INLET SYSTEM
	RO PERMEATE TANK	83	OFFICE/CONTROL ROOM
	TREATED WATER PUMPS		

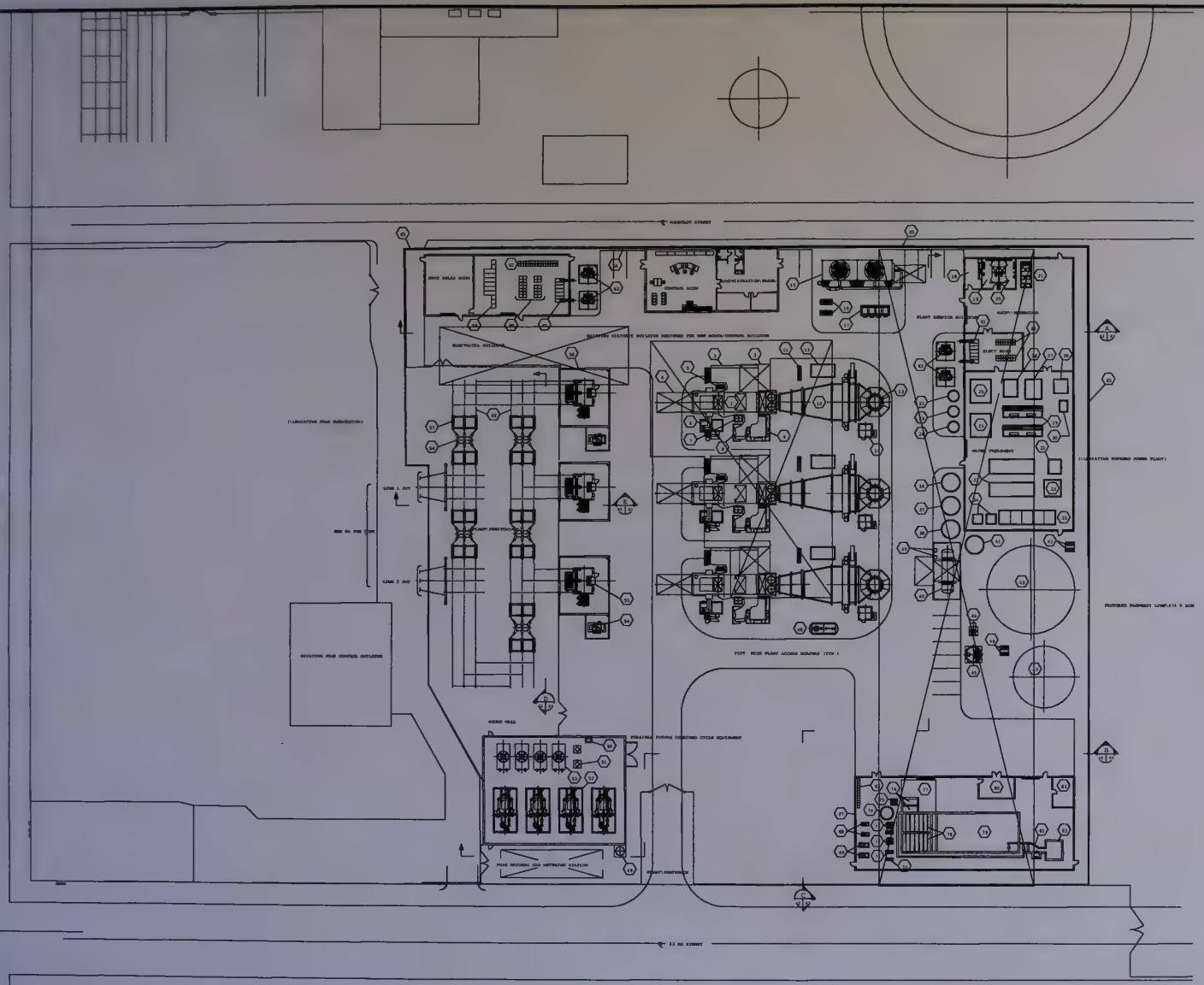
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FIGURE 2-2
SITE LAYOUT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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LEGEND:

1. LM6000 COMBUSTION TURBINE GENERATOR
2. TURBINE REMOVAL/MAINTENANCE AREA
3. CTG AIR INTAKE FILTER SYSTEM
4. GENERATOR ROTOR REMOVAL AREA
5. CTG FIRE PROTECTION SKID
6. GENERATOR BREAKER SWITCHGEAR
7. SPRINT SYSTEM SKID
8. NOx WATER INJECTION SKID
9. AUXILIARY SKID
10. SCR/CO CATALYST SYSTEM
11. AMMONIA FLOW BALANCE SKID
12. AMMONIA VAPORIZATION SKID
13. STACK
14. CEMS
15. DUPLEX CHILLER/COOLING TOWER PACKAGE
16. AUXILIARY COOLING PUMPS
17. COOLING TOWER CHEMICAL SYSTEM
18. LUNCH/BREAK ROOM
19. MEN'S LOCKERS/SHOWERS
20. WOMEN'S LOCKERS/SHOWERS
21. PLANT AIR COMPRESSOR PACKAGE
22. BULK CAUSTIC STORAGE (IF REQUIRED)
23. BULK ACID STORAGE (IF REQUIRED)
24. BULK SODIUM HYPOCHLORITE TANK
25. EDI TRAIN
26. EDI FEED PUMP SKID
27. RO CLEAN IN PLACE SKID
28. RO FEED PUMP SKID
29. RO TRAINS
30. RO CARTRIDGE FILTERS
31. ULTRA FILTRATION SYSTEM WASTE SKID
32. ULTRA FILTRATION SYSTEM TRAINS
33. ULTRA FILTRATION SYSTEM PUMP SKID
34. AIR BLOWERS
35. CHEMICAL METERING SYSTEMS
36. EQUALIZATION TANK
37. BIO REACTOR
38. ULTRA FILTRATION PERMEATE TANK
39. AQUEOUS AMMONIA FORWARDING PUMPS
40. AQUEOUS AMMONIA STORAGE TANK
41. RO PERMEATE TANK
42. TREATED WATER PUMPS
43. TREATED WATER STORAGE TANK
44. OIL/WATER SEPARATOR
45. WASTE WATER SUMP AND LIFT STATION
46. DI WATER PUMPS
47. DI WATER STORAGE TANK
48. TURBINE WASH WATER DRAIN TANK
49. NATURAL GAS INLET SCRUBBER
50. HYDROCARBON DRAIN TANK
51. DISCHARGE FILTER SCRUBBER (TYP. 2
52. FUEL GAS COMPRESSOR TYP 4
53. FUEL GAS COOLING RADIATOR TYP 4
54. 13.8kV/115kV SSU (TYP 4
55. 5MV AUXILIARY TRANSFORMER TYP. 2
56. 115 kV BREAKER (TYP 5
57. 115kV SWITCH (TYP 10
58. FIRE/BLAST WALL (TYP
59. 5kV SWITCHGEAR
60. BATTERIES
61. 480V SWITCHGEAR
62. 480V MCC'S
63. 480V STATION SERVICE TRANSFORMERS
64. EXISTING RETAINING WALL
65. NEW RETAINING WALL
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68. SUPLEMENTAL AERATION BLOWERS
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75. DIP TANK RECIRC/DRAIN PUMPS
76. DIP TANKS
77. CASSETTE LAYDOWN AREA
78. MEMBRANE TANKS
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80. CHEMICAL FEED/STORAGE ROOM
81. FEED CHANNEL
82. COMBINED INLET SYSTEM
83. OFFICE/CONTROL ROOM

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FIGURE 2-2
SITE LAYOUT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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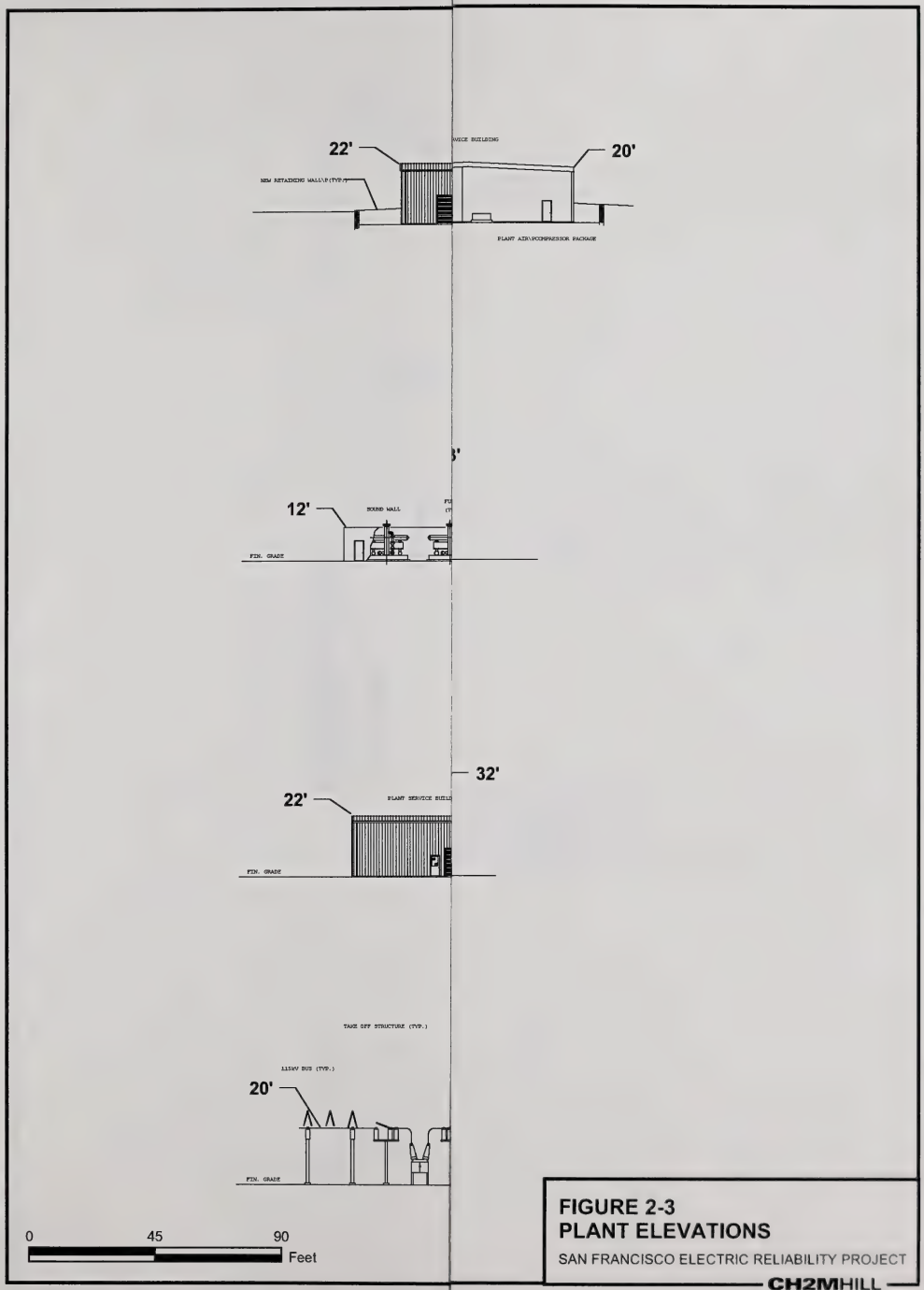
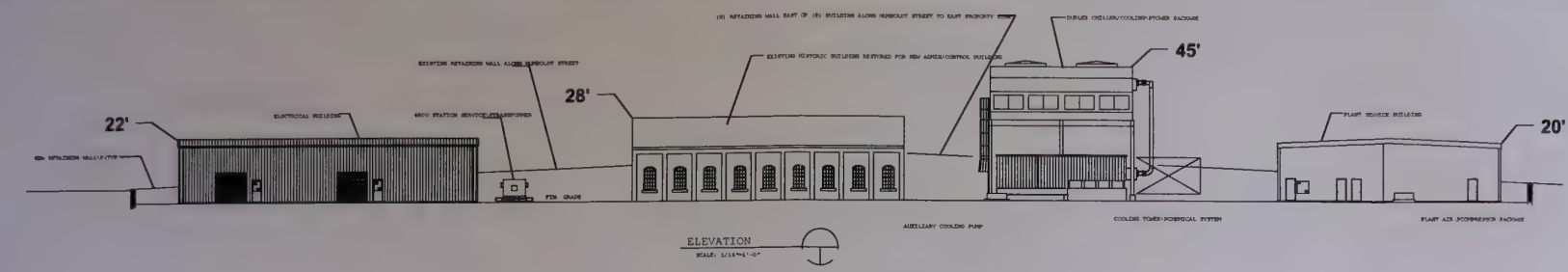
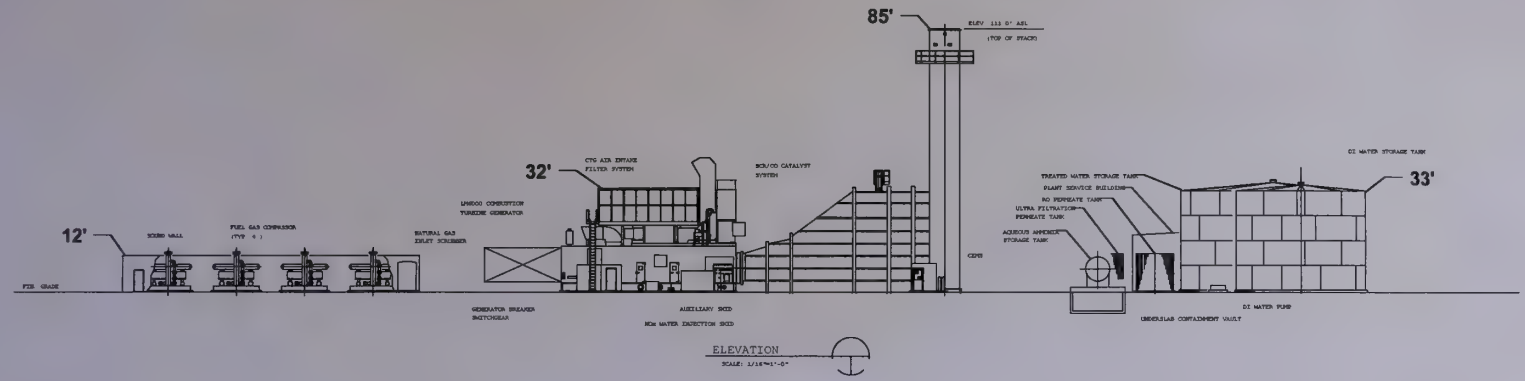


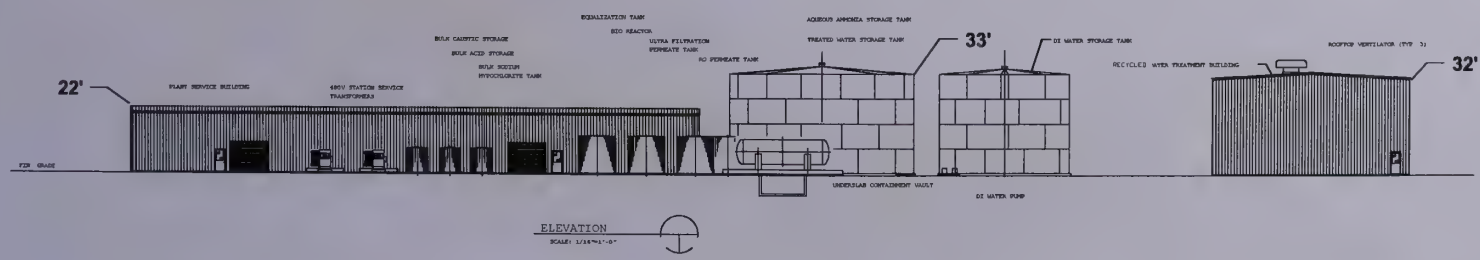
FIGURE 2-3
PLANT ELEVATIONS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

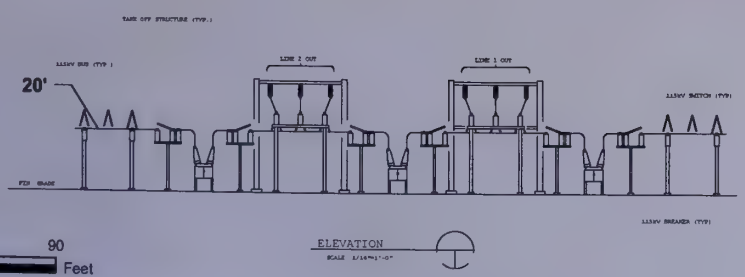
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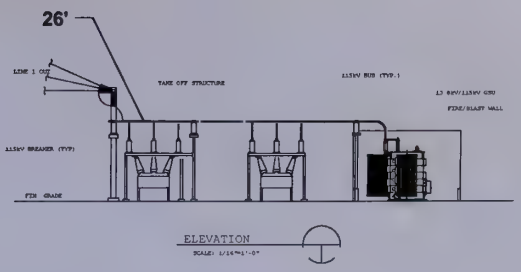
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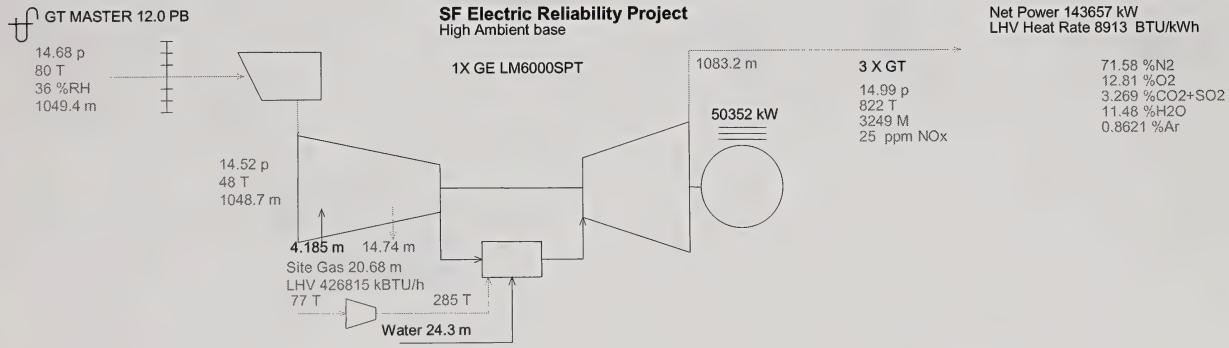


0 45 90 Feet

FIGURE 2-3
PLANT ELEVATIONS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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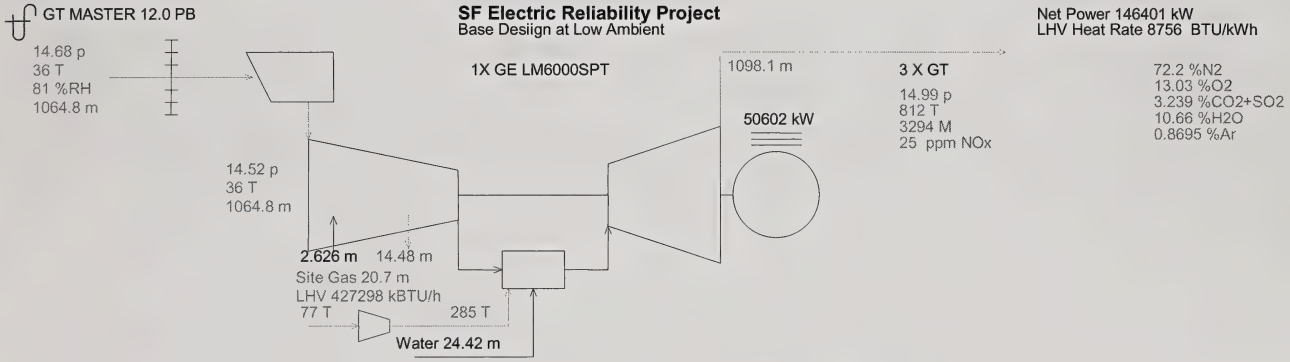


p[psia], T[F], M[kpph], Steam Properties: Thermoflow - STQUIK

FIGURE 2-4a
HEAT BALANCE
HIGH AMBIENT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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p[psia], T[F], M[kpph], Steam Properties: Thermoflow - STQUIK

FIGURE 2-4b
HEAT BALANCE
LOW AMBIENT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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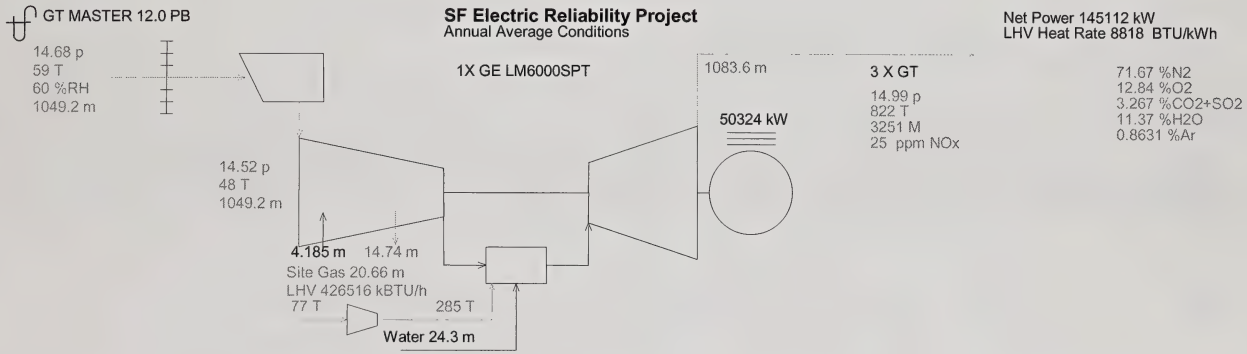
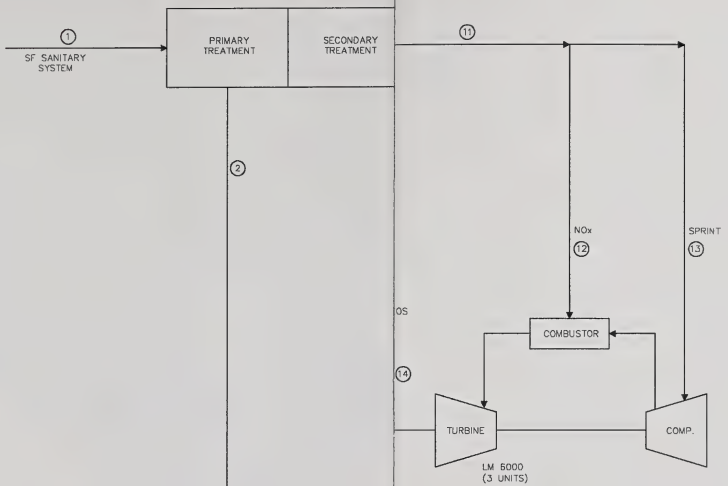


FIGURE 2-4c
HEAT BALANCE
ANNUAL AVERAGE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

p[psia], T[F], M[kpph], Steam Properties: Thermoflow - STQUIK

D122003004RDD_15

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SYMBOL	DATE	REVISION DESCRIPTION	DRAWN	APP'D
E	2-19-04	WATER BALANCE CHART ADJUSTED		
D	2-16-04	REVISED FOR 3 CTG'S		
C	1-27-04	REVISED PRELIMINARY ISSUE		
B	1-5-04	PRELIMINARY ISSUE FOR REVIEW		
A	11-18-03	PRELIMINARY ISSUE FOR REVIEW		

PB Power, Inc.
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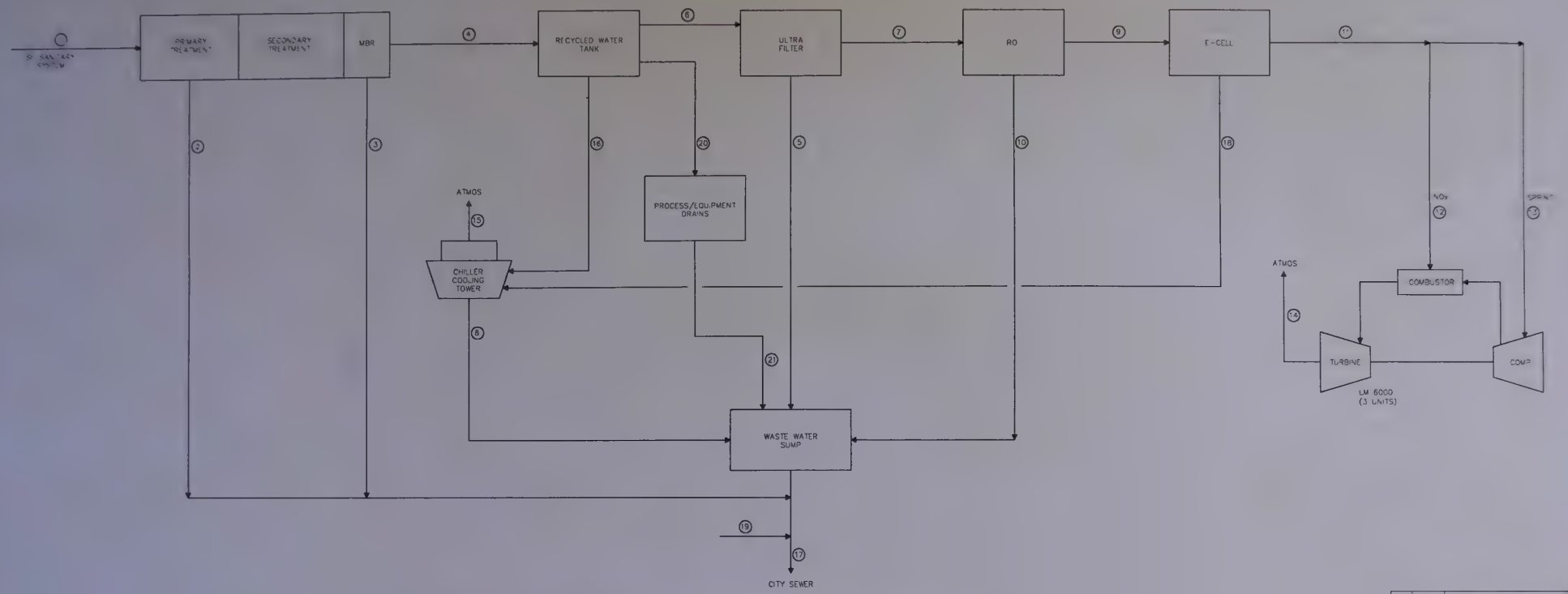
SAN FRANCISCO PUBLIC UTILITIES COMMISSION
SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
WATER BALANCE DIAGRAM

DR. LTW	APPROVED / DATE	DRAWING NO. M2.2	REV. E
DES. CM			
CHK. CM	PRINCIPAL IN CHARGE / DATE	SHEET OF	

FIGURE 2-5
WATER BALANCE DIAGRAM
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL



SFPUC Electric Reliability Project - Water Balance — Rev E

Point No	From	To	Average Water Use (3 CTG's in Operation) GPM	Maximum Water Use (3 CTG's in Operation) GPM	Notes
1	SF sanitary system	Primary/Secondary Treatment	349	408	
2	Primary Treatment	Plant wastewater system	100	100	
3	MBR	Plant wastewater system	10	12	
4	MBR	Recycled water tank	239	296	
5	Ultra Filter Reject	Plant Waste Water Sump	15	14	
6	Reclaimed water tank	Ultra Filter Inlet	222	221	
7	Ultra Filter Product	RO Inlet	207	206	
8	Cooling Tower Blowdown	Plant Waste Water Sump	5	16	(@ 5 cycles of conc)
9	RO Product	E-Cell Inlet	175	174	
10	RO Reject	Plant Waste Water Sump	33	32	
11	E-Cell Product (DI Water)	CTG NOx & SPRINT Injection	166	165	
12	E-Cell Product (DI Water)	CTG NOx Injection	141	140	@ 25 ppm NOx
13	E-Cell Product (DI Water)	CTG SPRINT Injection	25	25	
14	DI Water Evaporation	Atmosphere	166	165	
15	Cooling Tower Evaporation	Atmosphere	19	84	
16	Recycled Water Tank	Cooling Tower Makeup	15	71	
17	Plant wastewater system	City Sanitary Sewer	160	183	
18	E-Cell Reject	Cooling Tower Makeup	9	9	
19	Domestic	Plant wastewater system	2	4	
20	Recycled water tank	Plant / equipment drains	2	4	
21	Plant / equipment drains	Plant Waste Water Sump	2	4	

Annual reclaimed water usage: 43,013,015 gallons
(based on 12,000 turbine-hours) 132 acre-feet

E	2-19-04	WATER BALANCE CHART ADJUSTED
D	2-16-04	REVISED FOR 3 CTG'S
C	1-27-04	REVISED PRELIMINARY ISSUE
B	1-13-04	PRELIMINARY ISSUE FOR REVIEW
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SAN FRANCISCO, CALIFORNIA

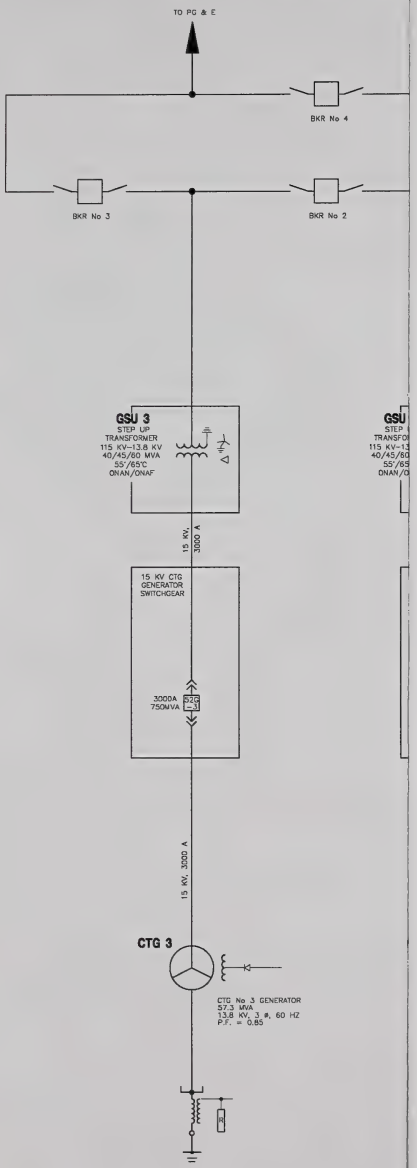
ELECTRIC RELIABILITY PROJECT
WATER BALANCE DIAGRAM

DRAWN LTW
DES CM
CHK CM
APPROVED
PRINCIPAL IN CHARGE
DATE
DRAWING NO. M2.2
REV E
SHEET

FIGURE 2-5
WATER BALANCE DIAGRAM
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SK012004005RDO 08 (3/2/04)



SYMBOL	DATE	REVISION DESCRIPTION	DRAWN	APP'D
C	02-19-04	REVISED EQUIP. NUMBERS & RATINGS AND ADDED 2-480V TRANSFORMERS		
B	02-06-04	REMOVED CTG 4		
A	12-29-03	PRELIMINARY ISSUE FOR REVIEW		

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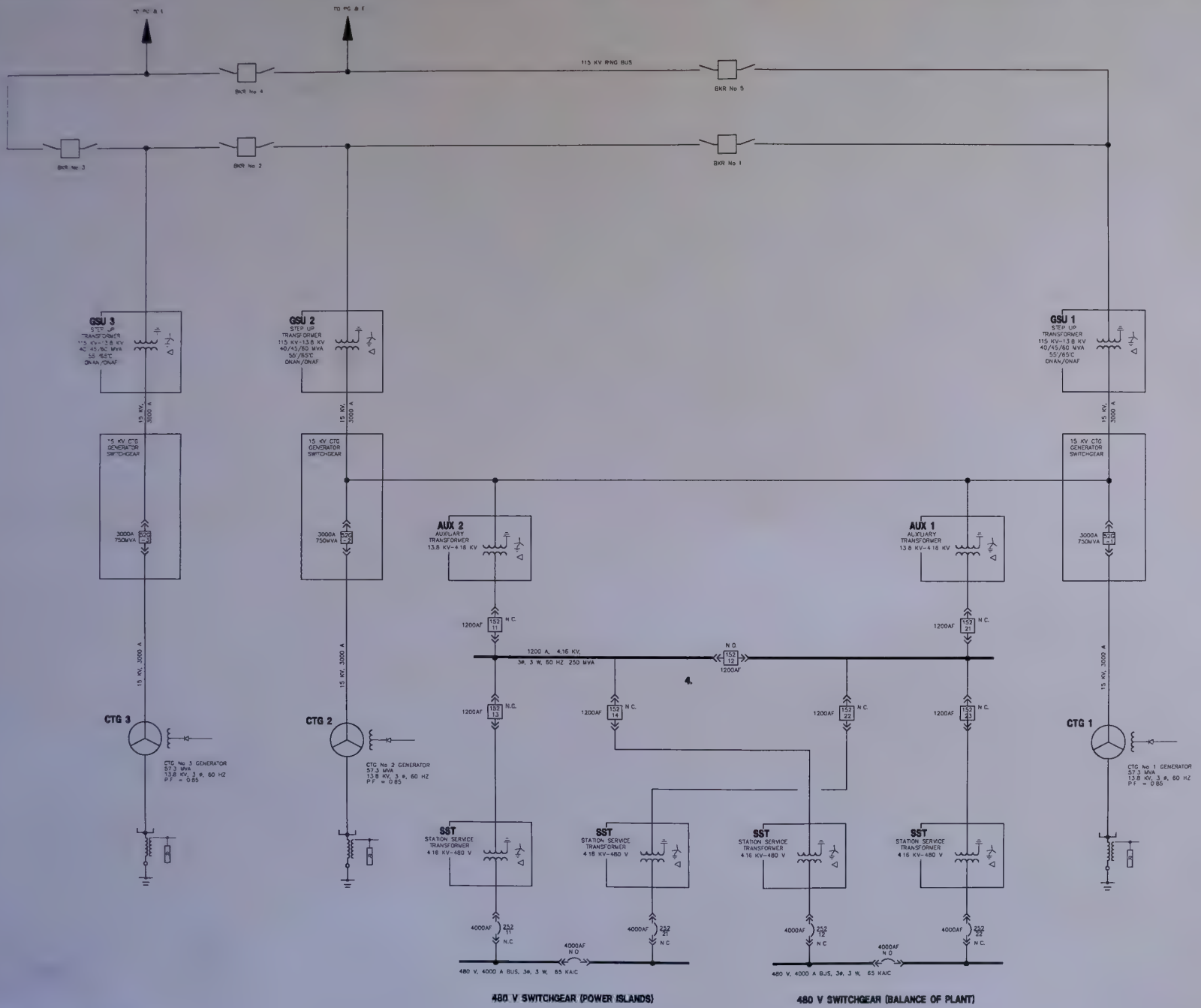
SAN FRANCISCO PUBLIC UTILITIES COMMISSION
SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
COMPOSITE SINGLE-LINE

DR. JP	APPROVED DATE	DRAWING NO. E2.1	REV. C
DES. JP			
CHK. JE	PRINCIPAL IN CHARGE DATE	SHEET OF	

FIGURE 2-6
COMPOSITE SINGLE-LINE
ELECTRIC RELIABILITY PROJECT

CH2MHILL



C	02-19-04	REVISED EQUIP. NUMBERS & RATINGS AND ADDED 2-480V TRANSFORMERS	
B	02-06-04	REMOVED CTG 4	
A	12-29-03	PRELIMINARY SSLE FOR REVIEW	
SYMBOL	DATE	REVISION DESCRIPTION	DRAWN APPD

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SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
COMPOSITE SINGLE-LINE

DR	JP		DRAWING NO. E2.1 REV C
DES	JP	APPROVED DATE	
CHK	JE	PRINCIPAL IN CHARGE DATE	SHEET OF

FIGURE 2-6
COMPOSITE SINGLE-LINE
ELECTRIC RELIABILITY PROJECT
CH2MHILL

SECTION 3.0

Purpose and Need

SECTION 3.0

Purpose and Need

The San Francisco Electric Reliability Project (SFERP) will consist of three combustion turbines with a total combined output of 145 MW. The California Independent System Operator (CAISO) has confirmed that the SFERP, in combination with the construction of a number of planned transmission projects, will enable closure of the entire Hunters Point Power Plant.

Replacement of existing in-City generation with a new flexible project, like the SFERP, that is equipped with advanced emissions control technology, will improve air quality and electric reliability. The SFERP should also support eventual closure of the Potrero Power Plant, particularly units 4, 5 and 6, as energy efficiency improvements, renewable resources, distributed generation and additional transmission facilities are added in and around San Francisco.

3.1 Policy Overview

For over 4 years, closure of the Hunters Point Power Plant has been a City objective. On July 9, 1998, the City entered into an agreement with Pacific Gas and Electric Company (PG&E) that provided for the shut down of the Hunters Point Power Plant "as soon as the facility is no longer needed to sustain electric reliability in San Francisco and the surrounding area and the FERC authorizes PG&E to terminate the Reliability Must Run (RMR) agreement for the facility" (CCSF, 1998). Since then, the City has been working with the CAISO, PG&E and the Hunters Point and Potrero communities to identify and build the facilities needed to provide for closure of the Hunters Point Power Plant without an adverse impact on reliability.

More recently, the City's interest in closing down the Hunters Point Power Plant has been extended to limiting use of and eventually closing down all existing in-City generation. On May 21, 2001, the Board of Supervisors passed Ordinance 124-01, which set forth conditions for the siting of new generation in Southeast San Francisco. This ordinance requires closure of Hunters Point Power Plant, clean up and limitations on use of Potrero units 4, 5, and 6, and clean up and eventual closure of Potrero Unit 3.

On November 21, 2002, the Board of Supervisors passed Resolution No. 827-02. In this resolution, the Board of Supervisors adopted the Electricity Resource Plan developed by the City's Public Utilities Commission and the Department of Environment (SF Electricity Resource Plan) "as a policy guideline to be used in proposing and implementing specific actions, subject to the requirements necessary to comply with environmental laws, including an analysis of alternatives and mitigations..."

The SF Electricity Resource Plan establishes the following priorities (SFPUC and San Francisco Department of Environment, 2002):

- Maximize Energy Efficiency
- Develop Renewable Power
- Assure Reliable Power

- Support Affordable Electric Bills
- Improve Air Quality and Prevent Other Environmental Impacts
- Support Environmental Justice
- Promote Opportunities for Economic Development
- Increase Local Control Over Energy Resources

To achieve these goals and allow for closure of existing in-City generation, the SF Electricity Resource Plan provides for development of a portfolio of new energy resources that includes energy efficiency improvements, renewables, distributed generation using renewable and clean technologies, transmission additions and new highly-efficient and operationally flexible generation at appropriate sites. The SFERP is part of the generation component of the SF Electricity Resource Plan. The City remains committed to maximizing energy efficiency, developing renewable power, encouraging clean distributed generation and supporting needed transmission additions. Nonetheless, the siting of new generation is also necessary in order to enable the closure of the Hunters Point Power Plant in the near term, to support closure of units at the Potrero Power Plant in the longer term, and to meet grid reliability requirements.

Both the SF Electricity Resource Plan and the SFERP support the statutory mandates to the California Energy Commission: (1) "to ensure that a reliable supply of electrical energy is maintained" (Public Resources Code (PRC) § 25001); (2) that "It is necessary that California both protect environmental quality and site new powerplants to ensure electricity reliability" (PRC § 25009); (3) that "The commission shall use these assessments and forecasts [i.e., the IEPR] to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy and protect public health and safety." (PRC § 25301 (a)); (4) the Commission "... formally specify statewide and service area electrical energy demands to be utilized as a basis for planning the siting and design of electric power generating and related facilities" (PRC § 25216 (b)); and (5) "the commission shall certify sufficient sites and related facilities which are required to provide a supply of electric power sufficient to accommodate demand...." (PRC § 25500.5)

In addition, by providing for improvements in reliability and air quality, the SF Electricity Resources Plan and the SFERP supports the general policy determinations of both the California Energy Commission's (CEC's) Integrated Energy Policy Report and the Energy Action Plan endorsed by the CEC, the California Public Utilities Commission, and California Power Authority.

3.2 Technical Background

The City and County of San Francisco (CCSF) is served by a combination of power imported over the high voltage transmission system and by power produced by generating units located within the City. At present, there is insufficient transmission capacity to reliably meet all of the City and peninsula's electrical loads. Therefore, both transmission and generation resources are necessary to reliably serve San Francisco and the peninsula.

3.2.1 Generation

In-City generation consists of two natural gas fired boiler-steam turbine-generator power plants. The 46-year-old, 163 megawatt (MW) Hunters Point Power Plant Unit 4 is owned by

PG&E and the 39-year-old, 206 MW Potrero Power Plant Unit 3 is owned by Mirant Potrero, LLC (Mirant). In addition, the Hunters Point Power Plant includes one 28-year-old, 52 MW, diesel-fuel-fired peaking turbine (Hunters Point 1). Potrero Power Plant also includes three 28-year-old, 52 MW, diesel-fuel-fired, peaking turbines (Potrero 4, 5, 6). In combination, these plants provide 570 MW of local generation (SFPUC and San Francisco Department of Environment, 2002).

Due to environmental restrictions, the operation of each of the diesel fuel-fired, peaking turbines in San Francisco is limited to no more than 877 hours per year. The steam generating units, Potrero Unit 3 and Hunters Point Unit 4, must meet increasingly stringent NO_x restrictions under Bay Area Air Quality Management District (BAAQMD) regulations. Specifically, each generation owner's Bay Area fleet of fossil-fueled power plants must meet the following average NO_x emission levels:

Jan. 1, 2002 - 47 parts per million (ppm)
Jan. 1, 2004 - 31 ppm
Jan. 1, 2005, - 15 ppm

For Potrero Unit 3 to continue to operate in compliance with BAAQMD NO_x limits, Mirant plans to install selective catalytic reduction (SCR) equipment in 2005 (While SCR equipment is installed on Potrero Unit 3, the unit will be out of service for an extended period of time creating an additional reliability challenge. Timing of the outage will be critical).

To continue operation of Hunters Point Unit 4 and remain in compliance with maximum BAAQMD NO_x emissions levels, PG&E intends to use interchangeable emission reduction credits (IERCs) and thus temporarily avoid the installation of SCR equipment. In the context of an appeal to the BAAQMD Hearing Board regarding the issuance of IERCs, PG&E has reached a settlement with community groups for use of IERCs through 2005. IERCs may be available for limited operation of Hunters Point Unit 4 for short periods beyond 2005. However, if Hunters Point Unit 4 is to continue to operate over a longer term, it will require substantial NO_x emission control equipment retrofits.

Table 3-1 below describes the existing power generation in San Francisco.

In addition to the in-City generation presented in Table 3-1, there is a 25 MW, combined-cycle combustion turbine generating unit on the peninsula, United Cogen.

TABLE 3-1
In-City Generation, Output and Fuel Type

Plant	Unit	Size (MW)	Fuel Type	In Service Date
Potrero	3	207	Natural Gas	1965
	4	52	Diesel	1976
	5	52	Diesel	1976
	6	52	Diesel	1976
Hunters Point	4	163	Natural Gas	1958
	1	52	Diesel	1976

3.2.2 Transmission System

The transmission system that supplies electricity to the peninsula and San Francisco is insufficient to serve the load in these areas without some in-area generation. There are four major constraints to the physical importation of electric power to San Francisco from other areas of the State. The first constraint is a restriction of the import capability into the Greater Bay Area (GBA). The second constraint is a restriction on the amount of power that can be transmitted to the peninsula from the East Bay. The third constraint is a restriction in the amount of power that can be supplied to the northern peninsula, including the City. And the fourth constraint involves capacity limitations on the 115 kV underground cable transmission system north of Martin Substation into the City (R.W. Beck et al., 2002).

The GBA transmission system consists primarily of four major outlying 500/230 kV substations (PG&E's Vaca-Dixon, Tesla and Metcalf substations and WAPA's Tracy substation) and a network of 230 kV "import" circuits across the boundary. The capability of the 500/230 kV transformer banks and 230 kV lines determine how much power can be imported into the GBA. The limited capacity of these facilities requires support from generation located within the GBA to meet GBA load requirements. Consequentially, the CAISO is forced to enter into RMR agreements to secure a large amount of generating capacity within the GBA. These RMR agreements allow the CAISO to dispatch generators or obtain load reductions when necessary to maintain local area reliability. In September 2003, the CAISO calculated that 4,331 MW of RMR capacity was needed in the GBA, even considering the requirements met by municipal and Qualifying Facility generation that can already be relied upon to be online when needed (Kott, 2003).

A further constraint to serving San Francisco's electrical load arises from the limited transmission capacity from the East Bay into the San Mateo substation. There are only two sets of 230 kV transmission lines (and two sets of smaller 115kV transmission lines) that interconnect the San Mateo substation with the East Bay. One 230 kV line crosses the Bay parallel to the San Mateo Bridge. The other 230 kV line crosses the Bay parallel to the Dumbarton Bridge. Due to capacity limitations on these lines, some peninsula-based generation must be operated during peak load and contingency conditions to prevent overloading these lines.

An additional limiting condition currently exists north of the San Mateo substation. To prevent overloading the transmission lines serving the upper peninsula and San Francisco at certain load levels and maintenance conditions, a minimum level of generation must be operating at Hunters Point Power Plant and/or Potrero Power Plant.

Finally, a capacity limitation exists on the 115 kV underground cable transmission system from the Martin Substation into the City. This constraint limits the efficacy of transmission projects, such as the Jefferson-Martin line, in increasing the load-serving capability of the City.

The peak electrical load for San Francisco and the peninsula significantly exceeds the load serving capability of the electric transmission system. This, combined with the fact that generation located in or near San Francisco is the most effective generation in the GBA for relieving transmission constraints, has prompted the CAISO to designate all the units at Hunters Point Power Plant and the Potrero Power Plant as RMR units for 2004 (Kott, 2003). These units are needed to relieve constraints on all the electrical paths to and within the GBA, the peninsula, and north of San Mateo as described above.

Given the significant transmission constraints in the area, since its inception, the CAISO has dedicated particular attention to studying the system in San Francisco and the peninsula and has identified numerous recommended transmission system improvements. Since 1999, the CAISO has been evaluating the need for an additional 230-kV line from the Peninsula into the City to relieve the constraint north of San Mateo substation. In 2002, the CAISO Governing board approved the Jefferson-Martin transmission line to transport additional power up the peninsula from the GBA. PG&E has applied for a certificate of public convenience and necessity (CPCN) from the California Public Utilities Commission (CPUC) for the Jefferson-Martin line. This case is currently being processed by the CPUC. In the context of the 2003 transmission planning process, additional transmission projects have been identified that could improve the effectiveness of the Jefferson-Martin line and otherwise increase load servicing capability in the peninsula and San Francisco areas as well as potentially reducing GBA RMR requirements.

3.3 Benefits of SFERP and Consistency with City Energy Policy

3.3.1 Closure of the Hunters Point Power Plant and Other In-City Generation

Construction of the SFERP, in combination with the construction of a number of planned transmission projects, will provide for sufficient electric reliability to facilitate the closure of Hunters Point Power Plant in the near term and will support closure of units at the Potrero Power Plant in the longer term.

The CAISO will determine whether the RMR agreement for Hunters Point Power Plant can be terminated. Accordingly, the City has held extensive discussions with the CAISO to clarify the conditions necessary for the CAISO to conclude that the Hunters Point Power Plant is no longer needed. These discussions have resulted in two letters and additional recent guidelines that delineate the requirements for closure of the Hunters Point Power Plant.[1]

These communications indicate that three combustion turbines located north of Martin and connected to the City's 115-kV system would provide for closure of the entire Hunters Point Power Plant (i.e. both Units 4 and 1) provided that the following transmission projects are in place:

- Newark-Ravenswood 230-kV Line Rerate (complete)
- Ravenswood-San Mateo 115-kV Line Rerate (complete)

[1] In the first letter the CAISO has indicated that if Hunters Point Unit 4 is retired before 2005, "there is inadequate load serving capability to serve the expected load in the San Francisco peninsula Area, unless additional generation and/or transmission reinforcement is constructed to support load growth in the area." Terry M. Winter, President and Chief Executive Officer, CAISO, Letter to Kevin Dasso and Theresa Mueller, April 18, 2003 (April 18, 2003 CAISO letter). The CAISO has further concluded that Hunters Point Power Plant Unit 4 could be replaced by four combustion turbines if: 1) these are electrically connected to the internal San Francisco 115 kV transmission network, 2) these are capable of providing no less than 495,000 MWh per year; and 3) a series of transmission projects that are currently either completed or planned are in place:

- Newark-Ravenswood 230-kV Line Rerate (complete)
- Ravenswood-San Mateo 115-kV Line Rerate (complete)
- Tesla-Newark #2 230-kV Line Rerate/Upgrade (complete)
- Ravenswood 230/115-kV Transformer (under construction, expected completion date May 2004)
- San Mateo-Martin #4 Line 60 115-kV Voltage Conversion (under construction, expected completion date June 2004)
- Potrero-Hunters Point (AP-1) 115-kV Underground Cable. (permitting underway, expected completion date either 2004 or 2005 depending on the route chosen).

- Tesla-Newark #2, 230-kV Line Rerate/Upgrade (complete)
- Ravenswood 230/115-kV Transformer (under construction, expected completion date May 2004) (PG&E, 2003a)
- San Mateo-Martin #4 Line 60 to 115-kV Voltage Conversion (under construction, expected completion date June 2004) (PG&E, 2003b)
- Potrero-Hunters Point (AP-1) 115-kV Underground Cable (permitting underway, expected completion date either 2004 or 2005 depending on the route chosen) (PG&E, 2003c).
- Bundling of the Tesla – Newark # 2, 230-kV line (proposed to be in-service May 2005)
- Reconductoring of the Ravenswood – Ames 115-kV lines #1 and #2 (proposed to be in-service May 2005)

Communications from the CAISO suggest that the Jefferson-Martin line could provide for closure of Hunters Point Unit 4 if emergency ratings can be used on certain facilities (discussed further below), and provided that the eight transmission projects listed above are in place. Hunters Point Unit 1 would not be able to close down absent the addition of in-City generation. Two issues will likely affect the CAISO's determination on the amount of generation at Hunters Point Power Plant that it will allow to shut down once the Jefferson-Martin line is in service: 1) whether and how quickly constraints on the 115-kV transmission system in the City are corrected, and 2) RMR needs in the GBA and the economic impact of allowing in-City plants to close down in light of these needs.

In 2003, the CAISO undertook an extensive review of the load serving capability (LSC) of the transmission grid into the peninsula and San Francisco (ACISO, 2003a). (The LSC represents the amount of customer demand that the system studied can serve.) The CAISO's study determined that constraints on the in-City, 115 kV underground transmission system limits the effectiveness of the Jefferson-Martin line in improving San Francisco's LSC. Transmission projects to ameliorate the constraints on the 115 kV transmission system are currently planned to be in-service by 2007. PG&E has argued that with the Jefferson-Martin line in place, Hunters Point Power Plant can be closed down and that the constraints on the 115 kV transmission system can be resolved by changing the emergency ratings on a number of facilities. To date, the CAISO has not concurred with this determination. The City has stated that the impact of PG&E's re-rating proposal should be independently evaluated.

The CAISO is required to ensure efficient use of the transmission system and to reduce to the extent possible the overall economic cost to the state's consumers (California Public Utilities Code §§345 and 345.5). In-City plants are substantially more effective in addressing some of the constraints within the GBA that give rise to the need for RMR capacity than any other generating units within the area. This means that, absent other improvements on the transmission system, if in-City generation is reduced, the CAISO would be required to dispatch substantially more RMR generation to satisfy these constraints. For example, for 2004, the CAISO determined in-City generation to be three to five times more effective than generation in the Delta to address GBA RMR needs (CAISO, 2003b). This feature of the transmission system makes in-City generating units particularly valuable resources to meet certain GBA constraints. These economic considerations may make the CAISO reluctant to

terminate RMR agreements with in-City generation absent the existence of replacement in-City generation.

An October 22, 2003 CAISO letter to the City provides that even with the Jefferson-Martin line in service, the CAISO will require 400 MW of generation north of San Mateo to meet all grid planning and operation needs in the City and the Peninsula. The 400 MW number provides a basis for the City to petition the CAISO to permit closure of the peaking units at Potrero Power Plant (Units 4, 5, and 6) once both the SFERP and the Jefferson-Martin line are in service. Potrero Unit 3 at 207 MW, plus the SFERP at 145 MWs, and United Cogen at 25 MWs, would amount to the 377 MWs, only 23 MWs short of the requisite 400 MWs. Moreover, given the limited allowed hours of operation of Potrero Units 4, 5 and 6, the value of these resources to address GBA needs is limited.

The City is continuing to work with the CAISO to further understand and refine the requirements for in-City generation in a variety of scenarios including with and without the Jefferson-Martin line in service.

3.3.2 The SFERP Will Reduce No_x Emissions and Thereby Prevent Other Environmental Impacts and Support Environmental Justice

The SFERP with its state-of-the-art gas turbine technology will improve San Francisco's air quality. Currently, the Potrero and Hunters Point Plants are the largest stationary sources of air pollutants in San Francisco, particularly oxides of nitrogen (NO_x) and small particulates (PM_{10}).

Table 3-2 presents the emissions per MWh for existing generating units in the City and the projected emissions per MWh of the SFERP. The table illustrates that the biggest emitters among the generating units in San Francisco are the four peaking units in San Francisco, which have minimal emission controls for oxides of nitrogen and produce 25 times more of this pollutant per megawatt hour than the SFERP.

TABLE 3-2
Emissions Per Megawatt-Hour for Existing and Proposed Plants

Plant	NO_x (pounds per MW-hour)	PM_{10} (pounds per MW-hour)
Potrero 3	1.1	0.03
Hunters Point 4	0.7	0.03
Hunters Point and Potrero Peakers	2.4 to 2.9	0.4
Potrero 3 (retrofit)	0.2	0.03
SFERP	0.09	0.06*

* Rubenstein, 2004.

The higher PM_{10} emissions for SFERP reflects the fact that the emission rate for Potrero 3 and Hunters Point 4 is their average emission rate, while the value for SFERP is the proposed permit limit, which is the maximum allowable level at any time, under any operating condition. There is no permit limit on the amount of PM_{10} emitted by Potrero 3 and Hunters Point 4. It is likely that under actual operating conditions, SFERP will emit significantly less particulates than either Potrero 3 or Hunters Point 4.

Replacing Hunters Point Power Plant with a clean new flexible dispatchable plant like the SFERP in combination with retrofitting Potrero Unit 3 with SCR technology would result in a substantial reduction of NO_x from in-City plants. Additional reductions would result to the extent the SFERP provides a basis for retiring the Potrero Power Plant peakers (Potrero Units 4, 5, and 6) once the Jefferson-Martin line is in service. Although operation of the Potrero Power Plant peakers is limited, nonetheless eliminating the peakers will have a beneficial impact on air quality. Based on 2002 data, shutting the Potrero Power Plant peakers would reduce NO_x emissions by 202 tons per year and PM_{10} emissions by 33 tons per year.

In addition, there is a potential that SFERP will cause a reduction in operation of Potrero Unit 3. Currently, because of the long startup times required for steam generator units like Potrero Unit 3, and the very limited hours of operation allowed for the existing peaking units in the City, the CAISO often operates the steam turbines in the City continuously through low load periods, to ensure that there is sufficient generation available to meet higher load periods during the day. Because individual SFERP units can be brought online within 10 to 30 minutes, construction of the SFERP should reduce the need to operate Potrero Unit 3 at minimum load to meet City and peninsula high load hours. Nonetheless, the extent to which the SFERP can support reduced operation of Potrero Unit 3, depends on the extent to which the CAISO continues to seek to operate Potrero Unit 3 to meet GBA needs. The SFPUC will continue to press the CAISO to identify opportunities to limit operation of Potrero Unit 3.

The substantial reduction of air emissions resulting from the closure of Hunters Point Power Plant and the Potrero Unit 3 SCR retrofit are particularly critical in responding to air quality concerns of the Hunters Point and Potrero communities. These communities share a common concern for public health, especially that of children and the elderly. Because all in-City generation has been located in Hunters Point and Potrero, these communities have borne a disproportionate impact from power generation in the City. In recognition of this impact, the City has engaged and will continue to engage in discussions with the Potrero community to identify mitigation measures that respond to community concerns about the siting of the SFERP at Potrero.

3.3.3 The SFERP Will Improve Reliability

Improving reliability is one of the primary justifications for the SFERP. The SFERP will support reliable electric service in San Francisco and the peninsula by replacing old unreliable units with a new highly-reliable technology. The CAISO has already revised the planning standards that apply in the GBA to address the fact that the number of old generating units in the GBA justify a more stringent criteria for that area (CAISO, 2002b). Nonetheless, the concern remains that the City's electric reliability is compromised by reliance on old, undependable generation to meet planning standards.

Recently, the City evaluated the relative reliability of in-City generation as compared to the average reliability of other generating units within the CAISO system. This evaluation was based on publicly available information on the status of generating units posted four times a day on the CAISO website (The CAISO declined to provide hourly unit availability information to the City for this effort).

The evaluation used data from July 10, 2001 through September 20, 2003 and added the time periods when units were curtailed and the amount of the curtailment.[2] The results of these calculations were used to determine the average MW curtailed for each unit within the CAISO system during the time period reviewed, and the equivalent outage rate.

The analysis showed that the outage rate for all units other than the San Francisco/peninsula units is 0.05; whereas, the outage rate for units in San Francisco and the peninsula is 0.14. This means that City/peninsula units are nearly three times more likely to be unavailable to serve load than the units reported for other areas of the CAISO grid. Hunters Point Unit 4 is the most unreliable of the City plants with an outage rate of 0.30, or six times the average outage rate of other units in the CAISO system.

The results of the evaluation are consistent with findings by the CEC reported in the 2003 Integrated Energy Policy Report published December 2003. In that report, the CEC indicated that, "Despite recent improvements in the electricity market as a whole, the Energy Commission is concerned about local reliability in San Diego and the San Francisco peninsula. Both areas experienced serious reliability problems during the energy crisis" (CEC, 2003).

The evaluation of unit outages coupled with the CEC data indicate that it is not necessarily sufficient to apply the CAISO Planning Standards to determine whether reliable electric service will be provided to electric consumers on the San Francisco and the peninsula. The data supports a further conclusion that additional resources are needed now to provide a level of reliability even close to that enjoyed in other areas of California.

In contrast to the old and unreliable generation that currently operates in the City, the SFERP involves new aeroderivative combustion turbine technology. This technology has a very high availability record. Replacing generation that is nearly three times less likely to be available than the average, with this new highly reliable technology will substantially enhance San Francisco/peninsula electrical reliability.

A further benefit of the SFERP is that it will add real power and reactive power into the electrical grid near the load. Thus, the SFERP will provide voltage support, reduce system losses, and increase operational reliability and flexibility. These attributes are true whenever generation is sited close to load and the alternative sources of generation to serve that load must be transported over long and heavily-loaded transmission lines. This is especially true for new generation located within San Francisco as documented by CAISO and CEC Staff in their testimony that comprises the Final Local System Effects section of the AFC for the proposed Potrero 7 Power Plant. (00-AFC-4).

3.3.4 The SFERP Complements a Portfolio of Energy Efficiency, Renewable Resources, and Clean Distributed Generation

The SFERP complements City efforts to develop energy efficiency improvements, renewable resources, and clean distributed generation. To provide for reliable operations, the transmission network in the City and the peninsula needs generation that is both dispatchable and properly located to benefit the network. The SFERP's size and

[2] The analysis excluded data from January 1, 2001 through July 9, 2001 because the data for these dates contained insufficient information and had formatting problems.

configuration enables maximum deployment of energy efficiency improvements, renewable resources and clean distributed generation. Because of its flexibility, the SFERP can be used to complement intermittent renewable resources such as wind. Therefore, at the same time as it is developing the SFERP, the City is aggressively implementing programs to promote energy efficiency and renewable resources.

The SFERP's equipment configuration, consisting of multiple smaller units, offers significant operational flexibility. This should enable the SFERP to accomplish its objective of a prompt closure of the Hunters Point Power Plant with the addition of a relatively small amount of new generation. The SFERP is smaller than Hunters Point Power Plant but has been deemed by the CAISO to be adequate to replace Hunters Point Power Plant if transmission additions that are currently planned are put into place. Further, the SFERP, in conjunction with on-going aggressive deployment of energy efficiency improvements, renewable resources, and distributed generation also supports efforts to reduce the operation of, and ultimately to replace units at the Potrero Power Plant.

Since the SFERP, energy efficiency improvements and renewables are all critical and compatible components of a portfolio of resources to serve San Francisco, the City is continuing to move forward aggressively with initiatives to promote energy efficiency and renewable resources as it develops the SFERP. In 2001, the City created the Mayor's Energy Conservation Account, which directed $25 million to finance aggressive energy efficiency programs in city buildings and facilities. Through the project, the City has already completed energy efficiency projects that targeted a peak demand reduction of over 5 MW including: the installation of LED signals at 1,100 intersections, a comprehensive lighting retrofit at the San Francisco General Hospital, and the installation of efficient refrigerators in Housing Authority facilities. Additional efficiency projects that are planned within San Francisco and at Hetch Hetchy facilities are projected to reduce peak demand by a further 3.7 MWs. The City is also working with PG&E to implement a $16 million program, the San Francisco Peak Energy Pilot Program, to increase electric reliability by reducing peak energy demand in San Francisco by 16 MWs by 2005. The program offers energy saving opportunities for residential and business customers in San Francisco.

As for renewables, the City has installed a 675 kW solar project on the Moscone Center. Projects are also planned for the Southeast Water Pollution Control Plant, Pier 96 and other locations. These projects are projected to result in a peak demand reduction of 1.1 MWs. In addition, the City is implementing a new solar project called Generation Solar to support the development of the solar energy market. The program will provide at least 100 residential and commercial participants with turnkey installation and financing of photovoltaic systems and accompanying energy-conservation measures. The City also has installed 3 MWs of renewable bio-gas cogeneration plants at its wastewater treatment plants.

The City is also supporting energy efficiency and renewables through its Environmental Justice grants program. The program provides funding to local non-profit organizations and businesses to promote energy efficiency, home weatherization and solar projects in the Potrero and Bayview-Hunters Point neighborhoods.

3.3.5 The SFERP Will Support Affordable Electric Bills

The SFERP will reduce costs from existing in-City generation. Closure of the Hunters Point Unit 4 would eliminate the need for costly upgrades to allow Unit 4 to operate in the longer term. These costs would include at a minimum the cost of buying and installing new emissions control equipment, estimated at $15 million and could include significant additional upgrades that have not yet been identified or quantified by PG&E (PG&E, 2003d).

Further, to the extent the SFERP–in combination with energy efficiency improvements, renewables, clean distributed generation and additional transmission–can accelerate closure of the Potrero units, ratepayers could avoid paying the fixed costs of these unit through RMR agreements. Pursuant to a settlement agreement between the CAISO, Mirant Potrero and PG&E, the annual revenue requirement eligible for payment under the RMR agreement for the fixed costs of the Potrero Power Plant from 2002 through 2004 will be $20,522,119 per year (CAISO, 2002a). The fixed costs of the peaking units comprise $1,838,093 of this amount. Although the fixed costs of the peakers constitute a little less than 10 percent of the total fixed costs for Potrero, ratepayers are shouldering these costs to provide for very limited hours operation.

3.3.6 The SFERP Will Increase Local Control Over Energy Resources

The City will own the SFERP. As the City is accountable to its citizens, this ownership model will increase local control of key energy resources. Further, local control should reduce the exposure of San Francisco ratepayers and more broadly the ratepayers of PG&E to the exercise of local market power from in-City generation. Pursuant to a 10-year power purchase agreement between the California Department of Water Resources and the City, the output of the SFERP will be used to serve all PG&E customers on a cost-of-service basis. This approach is preferable to having new strategically located generation in the hands of private entities with a profit incentive. Absent local control, the market power of such entities would only be curbed by imperfect FERC-approved market power mitigation measures.

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SECTION 4.0

Environmental Justice

SECTION 4.0

Environmental Justice

4.1 Introduction

California law defines environmental justice (EJ) as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies." Government Code Section 65040.12. The City and County of San Francisco (CCSF or City) supports the goals of environmental justice and is committed to promoting social justice and equality in the context of environmental policymaking and its administrative and regulatory programs. The SFERP is an important project to improve the City's energy infrastructure, and make the local generation resources more reliable, equitable and less polluting.

4.2 The City's Current Policy on Environmental Justice and New Generating Facilities in Southeast San Francisco

In May 2001, the San Francisco Board of Supervisors adopted Ordinance No. 124-01 establishing City policy for the development of electrical generating units in Southeast San Francisco. In that ordinance, the Board of Supervisors found that:

(A) The Energy Resources Conservation and Development Commission (California Energy Commission) has recognized Southeast San Francisco as a minority community entitled to environmental justice.

(B) All of the major electrical generating units in San Francisco are located in Southeast San Francisco, which includes the Bayview, Hunters Point, Potrero Hill and Dogpatch neighborhoods.

(C) Southeast San Francisco has a disproportionate number of industrial and polluting facilities.

(D) Southeast San Francisco has an extraordinarily high rate of childhood asthma and other serious respiratory diseases.

(E) Fossil fuel generation is associated with pollutants that damage public health.

(F) Oil-fueled generation, such as that produced by the Potrero Power Plant Units 4, 5, and 6 known as "Peakers," is potentially more harmful than natural gas-fueled generation.

(G) Alternative fuel sources are more protective of the environment and human health than fossil fuel generation.

(H) The City signed an agreement with PG&E calling for the permanent shutdown of the Hunters Point Power Plant, as determined by the appropriate state and federal regulatory authorities, as soon as the facility is no longer needed to sustain electrical reliability.

(I) The California Independent System Operator has identified transmission upgrades that would assist with providing reliable electricity to San Francisco.

(J) The City has agreed with PG&E to advocate the expeditious development of capacity (generation and/or transmission), which minimizes adverse community and environmental impacts to replace the Hunters Point Power Plant.

This series of findings sets forth unambiguously the City's view that Southeast San Francisco is a community of color with relatively high rates of serious respiratory diseases; and that the Southeast San Francisco has been disproportionately impacted by industrial facilities including electric power generation.

Ordinance 124-01 goes on to set forth a series of requirements for any new fossil-fueled power generation at Potrero in Southeast San Francisco. The requirements are designed to minimize adverse impacts from additional power plant development in the region. The requirements stress: 1) reduction of potential and actual emissions of criteria, toxic and hazardous air pollutants; 2) closure of Hunters Point Power Plant; 3) limiting or eliminating the operation of the peaking units at the Potrero Power Plant; 4) cleanup and eventual shut down of Potrero Power Plant Unit 3; and 5) mitigation of the adverse social, economic, cultural, environmental and public health impacts from the new generation on the impacted communities in Southeast San Francisco. Ordinance 124-01 provides for the development of an Energy Resource Plan to implement all practical transmission, conservation, efficiency and renewable alternatives to fossil fueled generation in the City.

4.3 The SFERP Supports the Objectives of Ordinance 124-01

Section 3, Purpose and Need, describes how the SFERP supports closure of existing dirty generation within Southeast San Francisco, as a component of a portfolio of resources that includes transmission, energy efficiency improvements, renewable resources, and clean distributed generation. As that section explains, a primary purpose of the City in developing the SFERP is to provide for closure of existing old dirty generation in the City while maintaining electrical reliability. The City seeks in particular to close down Hunters Point Power Plant in the near term, and to close down units at the Potrero Power Plant as soon thereafter as possible. Closure of existing dirty generation within Southeast San Francisco will eliminate a significant source of pollution that affects the local communities.

Nonetheless, the City recognizes that the SFERP, while significantly cleaner than existing generation, could have adverse air quality and public health impacts that must be minimized. Accordingly, the City has designed into the SFERP a variety of features to ensure that the SFERP supports the objectives set forth in Ordinance 124-01, as follows:

1) **Reduction of potential and actual emissions of criteria, toxic and hazardous air pollutants.**

 Although under Bay Area Air Quality Management District (BAAQMD) air quality rules the City is only required to offset oxides of nitrogen (NO_X) emissions from the SFERP, the City will offset both NO_X and precursor organic compounds (POC) emissions and will use best efforts to do so using local emission reduction credits (ERCs). In this manner, the City will assure that it is not exchanging impacts from the SFERP to the

local San Francisco communities for benefits from ERCs that would inure to distant communities in the BAAQMD. Consistent with BAAQMD rules, the City will install best available control technology (BACT) on the SFERP to reduce plant emissions to the greatest extent possible. Further, the City is conducting several emissions monitoring activities, as described below, to identify major sources of air pollution and develop a plan to reduce them.

2) **Closure of Hunters Point Power Plant.**

As is explained in Section 3, Purpose and Need, the City has received confirmation from the California Independent System Operator (CAISO) that with the installation of three combustion turbines in San Francisco, and the construction of a series of transmission upgrades that are currently planned, Hunters Point Power Plant can be closed.

3) **Limiting or eliminating the operation of the peaking units at the Potrero Power Plant.**

As is explained in Section 3, Purpose and Need, CAISO communications have indicated that with the installation of the SFERP, the construction of a series of transmission additions that are currently planned, and the construction of the Jefferson-Martin transmission line, the need for in-City generation will be reduced to no more than 400 MW north of San Mateo substation. With the SFERP in place and Hunters Point Power Plant closed, generation north of the San Mateo substation would significantly exceed 400 MWs, amounting to 533 MWs (the SFERP at 145 MW, Potrero 3 at 207 MW, Potrero 4, 5 and 6 peaking-units at 156 MW, and the United Cogeneration unit in the Peninsula at 25 MW). Thus, the City will aggressively push for closure of the peaking units at the Potrero Power Plant. Even before Jefferson-Martin is in place, given the flexibility of the SFERP, and the limited hours available for operation of the Potrero Power Plant peaking units, the CAISO is more likely to rely on the SFERP to meet system needs than on the Potrero peaking units.

4) **Clean up and eventual shut down of Potrero Power Plant Unit 3.**

Unrelated to the SFERP, Mirant and the CAISO have concluded a cost-recovery agreement for the installation of SCR on Potrero Unit 3; the project is expected to be complete no later than Spring of 2005. The installation of SCR at Potrero Unit 3 should substantially reduce the NO_X emissions from the unit. Thus, there is already a separate plan in place for substantial improvement in the emissions from Potrero Unit 3.

Once the SFERP and the Jefferson-Martin transmission line are in place, the City will focus on eliminating generation at the Potrero Power Plant. The CAISO has stated that it will continue to require 400 MW of generation north of San Mateo substation. The City will continue to work with the CAISO to identify alternatives to generation in order to reduce this number. As is explained in Section 3, Purpose and Need, the City is committed to implementing a program that includes transmission upgrades, energy efficiency improvements, renewables and clean distributed generation that should, over time, provide for closure of all of the existing dirty in-City generation.

5) Mitigation of the adverse social, economic, cultural, environmental and public health impacts from the new generation on the impacted communities in Southeast San Francisco.

The City is committed to mitigating the impact from the SFERP on the Southeast San Francisco communities. In addition to minimizing the emissions from the SFERP, as described above, the City intends to develop in the coming year a mitigation plan for particulate matter smaller than 10 microns (PM_{10}) and a community benefits plan.

During 2003, the City consulted extensively about the SFERP with community members and hosted several public meetings to introduce and discuss the project. Input from these meetings and from Supervisor Maxwell, who represents the Potrero, Hunters Point and Dogpatch neighborhoods, provided the basis for certain features of the SFERP designed to reduce impacts on the community:

a) The City undertook a review of available alternative sites that could meet the reliability criteria established by CAISO and provided access to the existing 115 kV transmission system. By developing the SFERP on the same site that was proposed by Mirant for the Potrero Power Plant Unit 7 (PPPU7) project, the City would prevent the development of the much larger Potrero 7 generating unit at the site and thereby limit the amount of increased emissions in Southeast San Francisco.

b) The City is exploring an alternative site for one of the four combustion turbines that it has available for development.

c) The City has designed a system for ammonia storage that seeks to minimize risks to public health. The system includes a containment area and covered sump. The City performed an off-site consequence analysis to assess the risk to humans if a catastrophic spill or rupture of the aqueous ammonia storage tank were to occur. While the California Energy Commission has typically only required assessment to a 75 ppm level, the City has reviewed potential impacts down to significantly lower levels. The assessment has confirmed that releases to the north, south and western boundaries of the SFERP(those boundaries with public access) would not exceed a concentration of 5 ppm, a barely perceptible level. Releases to the east, onto the Mirant property, could be higher. However, because they are located at a greater distance from the plant, residential areas would not be exposed to these higher levels in the event of an accidental release.

d) The City will use recycled water for cooling at the SFERP. Hence the City will significantly reduce the use of potable water at the plant and avoid any impacts from use of Bay waters.

e) In lieu of demolition, the City will rehabilitate the historic Meter House for use as an administration and control building.

f) In 2004, the City will work with the affected communities to develop a PM_{10} mitigation and community benefits package to offset remaining impacts from the SFERP. The package should address the adverse social, economic, cultural, environmental and public health impacts from the SFERP. Below are additional details about the process to develop the package.

Thus, the SFERP generally meets the objectives set forth in Ordinance 124-01. Moreover, before the SFERP is constructed, the project will be presented to the Board of Supervisors for approval of financing and contractual arrangements. At that time, the Board of Supervisors will have the opportunity to determine whether the features of the SFERP along with the PM_{10} mitigation/community benefits program adequately satisfy the requirements of Ordinance 124-01.

The City is aware that typically the California Energy Commission requires an assessment of Environmental Justice pursuant to President Clinton's Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994). Although it has not formulated a formal environmental justice policy, the CEC has established an approach in preparing an Environmental Justice Analysis. Appendix 8.8A undertakes such an analysis in a manner that is generally consistent with the CEC's approach solely for the purpose of meeting the CEC's data adequacy requirements. The City considers that notwithstanding that analysis, for purposes of assessing the environmental justice impacts of the SFERP, the more stringent findings and criteria from Ordinance 124-01 are controlling, as discussed in this section.

4.4 Process for Development of a PM_{10} Mitigation and Community Benefits Package

The City is committed to funding a meaningful PM_{10} mitigation and community benefits program, in addition to the offsets required under BAAQMD rules for the NO_X emissions generated by the SFERP. As stated previously, the City has already held numerous informational meetings regarding the SFERP with diverse members of the community which have helped shape the design of the project. Having completed submission of the Application for Certification for the SFERP, the City will turn to development of a PM_{10} mitigation and community benefits package. The City will convene a series of workshops to obtain public input and make recommendations regarding air quality mitigation measures and a community benefits program. These public workshops will provide a forum for members of the public to share their viewpoints and help the City evaluate a range of feasible options to reduce emissions from mobile and stationary sources, for inclusion as part of air quality mitigation measures and a community benefits program. In addition, the workshops will solicit the public's views on mitigation of adverse social, economic, and cultural impacts of the project. The City is particularly interested in identifying infrastructure and capital improvements to reduce air pollution in the Southeast area of the City. The City intends that the workshops will result in a package of long- and short-term mitigation options. Although it is likely that mitigation for the SFERP will address some, but not all of the components of the package, this effort will form the basis of a larger, comprehensive City plan to reduce air pollution in the Southeast area.

It is the City's intention that the public workshops will be attended by a diverse group of participants, including representatives from the residential and commercial sectors of the Dogpatch, Potrero and Bayview-Hunters Point neighborhoods, local environmental groups, governmental agencies interested in the SFERP and the general public. The City intends to commence the workshop process in May of 2004.

The City notes that pursuant to a power purchase agreement between the City and the Department of Water Resources, the SFERP will be funded by California ratepayers on a cost-recovery basis over the first 10 years of project operation.

In addition to development of a PM_{10} mitigation and community benefits package, the City will undertake local air quality monitoring that will provide necessary information to support additional air quality improvements in Southeast San Francisco. Currently, the City is working in a collaborative partnership with the BAAQMD, the California Air Resources Board and a local environmental justice group to temporarily operate a local air quality monitoring station in the Hunters Point community, located at Whitney Young Circle at Hudson and Progress streets in San Francisco. This monitoring station will collect data on criteria and toxic air pollutants for a period of 12 months. The City will expand this local air quality monitoring program and operate two additional monitoring stations in the immediate vicinity of the Potrero Power Plant site, in the Dogpatch and Potrero Hill neighborhoods, prior to start of construction of the SFERP. The two monitoring stations in the Dogpatch and Potrero neighborhoods will provide data on the concentration levels of criteria air pollutants. Data will be compared with the criteria pollutant measurements obtained by BAAQMD at its permanent monitoring station, which is located on Arkansas Street in San Francisco for the same period. This comparison will help to determine if there are any significant local variations in the ambient air quality between the different monitoring locations. Depending on the data obtained from the pre-construction period for the SFERP, the City may continue to monitor the ambient air concentrations of criteria pollutants in the vicinity of the Potrero Power Plant site after construction and initial start-up. The air monitoring information will provide the basis to assess the need for additional programs to improve air quality in Southeast San Francisco.

SECTION 5.0

Electric Transmission

SECTION 5.0

Electric Transmission

5.1 Introduction

Section 5 discusses the transmission interconnection between the San Francisco Electric Reliability Project (SFERP) and the existing electrical grid, and the anticipated impacts that operation of the facility will have on the flow of electrical power in the San Francisco region of California. To better understand the impacts of the proposed SFERP on transmission and power flows, the discussions in this section will focus on those areas that allow a critical review of the electrical transmission and interconnection. More specifically, this analysis will contain discussions of:

- The proposed electrical interconnection between SFERP and the electrical grid
- The proposed electrical transmission line alignment
- The impacts of the electrical interconnection on the existing transmission grid
- Potential nuisances (electrical, magnetic, audible noise, and corona effects)
- Safety of the interconnection
- Description of applicable laws, ordinances, regulations, and standards (LORS)

The proposed SFERP site is located in an industrial area of the City of San Francisco, California in San Francisco County. This location was selected, in part, for its proximity to the Pacific Gas and Electric Company (PG&E) Potrero Switching Substation. Figure 5-1 (all figures are located at the end of this section) shows the location of SFERP in relationship to the Potrero Substation. This location, adjacent to the Potrero substation, will allow for very short interconnecting transmission lines to SFERP.

The SFERP 115-kilovolt (kV) transmission line will be directly connected to PG&E's transmission system through the Potrero Substation. Two points of interconnection to the substation will be constructed by utilizing two existing switchyard bays. These bays are currently occupied by 115-kV lines from the Potrero Power Plant (Potrero PP) unit 3 and units 4, 5, and 6, respectively.

5.2 Transmission Interconnection

SFERP will link to the power grid through the PG&E Potrero Substation by two three-phase aboveground transmission lines. The proposed 115-kV connection will cross over an existing PG&E service road from SFERP to towers located within the Potrero substation, turn north for approximately 140 feet to a turning tower aligned with existing bays for breaker positions 162 and 192. Breaker positions 162 and 192 are currently connected to the Potrero PP. These lines will be re-located to two existing bays north of Humboldt Street with the addition of two new towers, new breakers, and dead-end structures in the substation. From a new turning tower the two lines will connect to the existing substation dead-end structure (see Figure 5-2). The existing turning towers that serve the Potrero PP will be removed.

From the SFERP switchyard to the connection at the Potrero Substation breakers, the total transmission distance is less than 300 feet. Because the SFERP and the breakers Potrero Substation are directly adjacent to each other, and the requirement for high reliability, no other transmission interconnection alternative has been considered.

5.3 SFERP Switchyard

The SFERP switchyard will be composed of five 115-kV, SF_6-insulated, dead tank, high-voltage circuit breakers in a three-phase ring buss configuration. The main conductors of the ring buss and connections to the generator step-up transformers will be uninsulated tubular aluminum buss bars supported on steel structures with porcelain insulators. Each transformer will connect to a separate node of the ring. The two three-phase circuits connecting the SFERP switchyard with the Potrero Substation will also be connected to separate nodes on the ring. Two dead-end structures will be used to transition these circuits from the open buss work to the transmission cables. For operational flexibility and maintenance, three-pole disconnect switches will be located on each side of each breaker and between each transformer and the ring buss.

Appropriate voltage and current sensing instruments will be provided on the ring buss and the connections to the ring buss to provide complete metering and electrical protection. The ring buss will be supported by a comprehensive protective relaying scheme, including over current and differential current relaying, to ensure a fast response to abnormal conditions that will isolate the affected area and permit continued service of the unaffected parts of the buss. The circuit breaker controls and protective relays will be housed in a relay room of the electrical building just north of the switchyard. The switchyard will also be monitored through the plant control system where breaker position and system parameters will be available to the operator in the main control room. The plant control system will also display all alarm conditions associated with the switchyard.

5.4 Interconnection System Impact Study

The City submitted a completed Interconnection Application (IA) to the California Independent System Operator Corporation (CAISO) for the SFERP. The proposed project at that time consisted of four LM6000 units rated at 48.7 megawatts (MW) each and one steam turbine rated at 15 MW. The maximum output of the proposed project would have been 209.8 MW. The on-line date of the proposed project was June 2005. A new IA has been filed to properly represent the plant as proposed in this application. Since the new plant arrangement with three (3) simple cycle LM6000 combustion turbines will have a lower output, the impact to the grid and PG&E local system is expected to be less.

The proposed project will be connected to PG&E's transmission grid via new 115-kV generation tie lines. The System Impact Study (SIS) report presented the results for a plant of four LM6000 units and the one steam unit that would connect directly to PG&E's Potrero 115-kV Substation. A copy of the SIS is presented in Appendix 5A.

This SIS identified:

- Transmission system impacts caused solely by the addition of the plant as described above
- System reinforcements, if any, necessary to mitigate the adverse impact under various system conditions

To determine the system impacts caused by the addition of the SFERP, studies were performed using the following full loop base cases:

- 2005 Summer Peak
- 2005 Fall Peak

The studies performed included:

- Steady State Power Flow
- Dynamic Stability Analysis
- System Protection

PG&E's evaluation was based on the assumption that Mirant Corporation's proposed Potrero Unit 7 project would not be built. This assumption is consistent with the fact that the SFERP is proposed for the same location as proposed for Potrero Unit 7. PG&E's evaluation has concluded that the addition of the SFERP would cause no normal overloads during conditions studied for 2005. The project would exacerbate one transmission facility overload following Category B contingencies in the 2005 Summer Peak Base Case and none in the 2005 Fall Peak. Following Category C contingencies, the project would cause no overloads during the 2005 conditions studied. Mitigation of the pre-project and post-project overload will be accomplished by an existing PG&E capacity project.

The Substation Evaluation identified no overstressed equipment associated with the SFERP.

Dynamic Stability Study results indicated that the transmission system's transient performance, relative to the CAISO grid planning standards, would not be affected by the SFERP following selected disturbances.

Based on the results of the SIS conducted for a significantly larger SFERP, the SFERP will not adversely affect the grid.

5.5 Transmission Line Safety and Nuisance

This section discusses safety and nuisance issues associated with the proposed electrical interconnection of SFERP with the electrical grid. Construction and operation of the proposed overhead transmission lines will be undertaken in a manner to ensure the safety of the public as well as maintenance crews while supplying power with minimal electrical interference.

5.5.1 Electrical Clearances

Typical high-voltage overhead transmission lines are composed of bare conductors connected to supporting structures by means of porcelain, glass, or plastic insulators. The air surrounding the energized conductor acts as the insulating medium. Maintaining

sufficient clearances, or air space, around the conductors to protect the public and utility workers is paramount to ensure safe operation of the line. The safety clearance required around the conductors is determined by normal operating voltages, conductor temperatures, short-term abnormal voltages, wind-blown swinging conductors, contamination of the insulators, clearances for workers, and clearances for public safety. Minimum clearances are specified in the National Electric Safety Code (NESC) and California Public Utilities Commission (CPUC) General Order 95 (GO 95). Electric utilities, state regulators, and local ordinances may specify additional (more restrictive) clearances. Typically, clearances are specified for:

- Distance between the energized conductors themselves
- Distance between the energized conductors and the supporting structure
- Distance between the energized conductors and other power or communication wires on the same supporting structure, or between other power or communication wires above or below the conductors
- Distance from the energized conductors to the ground and features such as roadways, railroads, driveways, parking lots, navigable waterways, airports, etc.
- Distance from the energized conductors to buildings and signs
- Distance from the energized conductors to other parallel power lines

The proposed SFERP transmission interconnections will be designed to meet all national, state, and local code clearance requirements. The minimum ground clearance for 115-kV transmission (per GO 95) is 30 feet in this area. Under normal conditions, the line operates well below maximum conductor temperature, and thus, the average clearance is greater than the minimum. Regardless of design height, the magnetic and electric field calculations are based on these minimum conductor clearances for the lowest-level conductor and the design spacing of the higher-level conductors relative to the lower-level conductors. This is expected to be the worst-case scenario with actual design conductor heights exceeding those used for this analysis.

5.5.2 Electrical Effects

The electrical effects of high-voltage transmission lines fall into two broad categories: corona effects and field effects. Corona is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware due to very high electric field strength at the surface of the metal during certain conditions. Corona may result in radio and television reception interference, audible noise, light, and production of ozone. Transmission lines are designed with standard practices and components designed to reduce or eliminate the effects of corona. Field effects are the voltages and currents that may be induced in nearby conducting objects. The transmission line's 60-hertz (Hz) electric and magnetic fields can cause these effects.

5.5.2.1 Electric and Magnetic Fields

Operating power lines, like the energized components of electrical motors, home wiring, lighting, and all other electrical appliances, produce electric and magnetic fields, commonly referred to as EMF. The EMF produced by the alternating current electrical power system in

the United States has a frequency of 60 Hz, meaning that the intensity and orientation of the field changes 60 times per second.

The 60-Hz power line fields are considered to be extremely low frequency. Other common frequencies are AM radio, which operates up to 1,600,000 Hz (1,600 kHz); television, 890,000,000 Hz (890 MHz); cellular telephones, 900,000,000 Hz (900 MHz); microwave ovens, 2,450,000,000 Hz (2.4 GHz); and X-rays, about 1 billion, billion (10^{18}) hertz. Higher frequency fields have shorter wavelengths and greater energy in the field. Microwave wavelengths are a few inches long and have enough energy to cause heating in conducting objects. High frequencies, such as X-rays, have enough energy to cause ionization (breaking of molecular bonds). At the 60-Hz frequency associated with electric power transmission, the electric and magnetic fields have a wavelength of 3,100 miles and have very low energy that does not cause heating or ionization. The 60-Hz fields do not radiate, unlike radio-frequency fields.

Electric fields around transmission lines are produced by electrical charges on the energized conductor. Electric field strength is directly proportional to the line's voltage; that is, increased voltage produces a stronger electric field. The electric field is inversely proportional to the distance from the conductors, so that the electric field strength declines as the distance from the conductor increases. The strength of the electric field is measured in units of kilovolts per meter (kV/m). The electric field around a transmission line remains practically steady and is not affected by the common daily and seasonal fluctuations in usage of electricity by customers.

Magnetic fields around transmission lines are produced by the level of current flow, measured in terms of amperes, through the conductors. The magnetic field strength is directly proportional to the current; that is, increased amperes produce a stronger magnetic field. The magnetic field is inversely proportional to the distance from the conductors and, therefore, the strength of the magnetic field rapidly decreases as distance is increased from the conductor. Thus, like the electric field, the magnetic field strength declines as the distance from the conductor increases. Magnetic fields are expressed in units of milligauss (mG). The amperes and, therefore, the magnetic field around a transmission line fluctuate daily and seasonally as the usage of electricity varies.

Considerable research has been conducted over the last 30 years on the possible biological effects and human health effects from EMF. This research has produced many studies that offer no uniform conclusions about whether or not long-term exposure to EMF is harmful. In the absence of conclusive or evocative evidence, some states, including California, have chosen not to specify maximum acceptable levels of EMF. Instead, these states mandate a program of prudent avoidance whereby EMF exposure to the public would be minimized by encouraging electric utilities to use low-cost techniques to reduce the levels of EMF.

5.5.2.2 Audible Noise

Corona is a function of the voltage of the line, the diameter of the conductor, and the condition of the conductor and suspension hardware. The electric field gradient is the rate at which the electric field changes and is directly related to the line voltage.

The electric field gradient is greatest at the surface of the conductor. Large-diameter conductors have lower electric field gradients at the conductor surface and, hence, lower corona than smaller conductors, everything else being equal. Also, irregularities (such as

nicks and scrapes on the conductor surface) or sharp edges on suspension hardware concentrate the electric field at these locations and, thus, increase corona at these spots. Similarly, contamination on the conductor surface, such as dust or insects, can cause irregularities that are a source for corona. Raindrops, snow, fog, and condensation are also sources of irregularities. Corona typically becomes a principal design concern for transmission lines having voltages of 345 kV and above.

5.5.2.3 EMF Assumptions

It is important that any discussion of EMF includes the assumptions used to assess these values and to remember that EMF in the vicinity of the power lines vary with regard to line design, line loading, distance from the line, and other factors. Both the electric field and audible noise depend upon line voltage, which remains nearly constant for a transmission line during normal operation. A worst-case voltage of 121 kV (115 kV + 5 percent) was used in the calculations for the 115-kV lines.

The magnetic field is proportional to line loading (amperes), which varies as power plant generation is changed by the system operators to meet increases or decreases in demand for electrical power. Line loading values assumed for the EMF studies were based on the maximum plant output. The maximum total output of the SFERP plant is assumed to be a net generation of 145 MW. The power will be transmitted away from the power plant in two circuits.

The data and assumptions used for the EMF studies can be noted from the discussions contained in the following paragraphs and the figures included in the following pages.

5.5.2.3.1 EMF Calculations. EMFs were calculated at 3 feet above flat terrain using FIELDS 1.0, a program developed by Southern California Edison. The FIELDS program uses the basic algorithms for the calculation of electric and magnetic fields listed in the Electric Power Research Institute's *Transmission Line Reference Book,* known as the "Red Book" (pages 330-331, 409-410, and 341-342). The electric field calculation assumes earth as a perfect conductor and sums the vector components of the field created by the charge on each conductor. Likewise, the magnetic field calculation performs a vector sum of the contribution to the field from each of the conductor currents. FIELDS calculates both the square root of the sum of the squares of the vertical and horizontal field components and also the maximum phasor component based upon the magnitude of the major semi-axis of the field ellipse. FIELDS calculates the electric fields expressed as kV/m and the magnetic fields expressed in mG. The various inputs for the calculations include voltage, current load (amps), current angle (i.e., phasing), conductor type and spacing, number of subconductors, subconductor bundle symmetry, spatial coordinates of the conductors and shield wire, various labeling parameters, and other specifics. Magnetic field and corona modeling was conducted on the phase conductors in the southern end of the ring buss in the proposed Potrero Substation. The southern end of the buss was chosen since it is the energized portion of the substation closest to 23rd Street. The distance from the buss conductors to the fence along the northern side of 23rd Street is approximately 140 feet. The modeling was conducted with the worst-case condition of the three combustion turbines operating at full load (nominal 48 MW_{net} each) and the ring buss open on the north end forcing all of the current to flow around the south end of the ring buss.

A power flow model was developed based on SFERP's maximum transmission level.

5.5.2.3.2 Results of EMF and Audible Noise Assessment

Electric Field and Audible Noise. Line voltage and arrangement of the phases determine the electric field. The corona produced in the substation results in the creation of audible noise and radio and television interference. Two different conditions were modeled, corona effects produced in both fair weather and rain. The results of the electric field for 115-kV buss are shown in Figure 5-3.

In fair weather, the audible noise will not be observable by a person standing on the street (even if the other plant equipment were silent, which will not be the case when the plant is operating). During rain, the noise level will be higher but will be masked by the sound of the falling rain drops as well as the sound from the other equipment in the plant.

The corona-produced radio interference may affect AM radio reception but not FM reception. During rain, radio interference may produce a slightly noticeable hum on an AM radio positioned next to the fence when it is tuned to a weak or distant station. In the fair weather case, the radio interference from the ring buss will not be noticeable.

The corona-produced television interference may cause a television receiver to have a noise band across the picture when the television is operated next to the fence. Further away, this will not be noticeable. The audible noise produced for the 115-kV buss is shown in Figure 5-4. Radio and television interferences produced by the 115-kV buss are shown in Figures 5-5 and 5-6, respectively.

Magnetic Field. The magnetic fields generated by the conservative assumptions presented above are 4 mG at the fence. This is a level of magnetic fields that is found in many public places and is typically found in most homes, for instance, in the kitchen near operating appliances. At 60 feet from the fence on the south side of 23rd Street (200 feet from the buss conductors), the magnetic field drops to 2 mG, a level that is experienced in many public places. The results of the magnetic field calculations for the 115-kV buss is provided in Figure 5-7 and the resulting magnetic field created by the generator busses is provided in Figure 5-8.

5.5.2.3.3 Transmission Line EMF Reduction. While the State of California does not set a statutory limit for electric and magnetic field levels, the CPUC, which regulates electric transmission lines, mandates EMF reduction as a practicable design criterion for new and upgraded electrical facilities.

In keeping with the goal of EMF reduction, the interconnection of the SFERP will be designed and constructed using the principles commonly followed by electric utilities. Primary techniques for reduction of EMF are:

- Increase the distance between conductors and EMF sensors
- Reduce the spacing between the line conductors
- Minimize the current on the line
- Optimize the configuration of the phases (A, B, C)

Anticipated EMF levels have been calculated for the SFERP interconnection as preliminarily designed. The CEC requires actual measurements of pre-interconnection background EMF for comparison with measurements of post-interconnection EMF levels. If required, the pre- and post-interconnection verification measurements will be made consistent with

Institute of Electrical and Electronics Engineers (IEEE) guidelines and will provide sample readings of EMF. Additional measurements will be made upon request for locations of particular concern.

5.5.2.3.4 Conclusion on EMF and Audible Noise. In conclusion, the public exposure to EMF and audible noise levels are well within accepted levels.

5.5.2.4 Induced Current and Voltages

A conducting object, such as a vehicle or person in an electric field, will have induced voltages and currents. The strength of the induced current will depend upon the electric field strength, the size and shape of the conducting object, and the object-to-ground resistance. Examples of measured induced currents in a 1-kV/m electric field are about 0.016 milliamperes (mA) for a person, about 0.41 mA for a large school buss, and about 0.63 mA for a large trailer truck.

When a conducting object is isolated from the ground and a grounded person touches the object, a perceptible current or shock may occur as the current flows to ground. Shocks are classified as below-perception, above-perception, secondary, and primary. The mean perception level is 1.0 mA for a 180-pound man and 0.7 mA for a 120-pound woman. Secondary shocks cause no direct physiological harm, but may annoy a person and cause involuntary muscle contraction. The lower average secondary-shock level for an average-sized man is about 2 mA.

Primary shocks can be harmful. Their lower level is described as the current at which 99.5 percent of subjects can still voluntarily "let go" of the shocking electrode. For the 180-pound man this is 9 mA; for the 120-pound woman, 6 mA; and for children, 5 mA. The National Electrical Safety Code (NESC) specifies 5 mA as the maximum allowable short-circuit current to ground from vehicles, trucks, and equipment near transmission lines.

The mitigation for hazardous and nuisance shocks is to ensure that metallic objects on or near the right-of-way are grounded and that sufficient clearances are provided at roadways and parking lots to keep electric fields at these locations sufficiently low to prevent vehicle short-circuit currents from exceeding 5 mA.

Magnetic fields can also induce voltages and currents in conducting objects. Typically, this requires a long metallic object, such as a wire fence or aboveground pipeline that is grounded at only one location. A person who closes an electrical loop by grounding the object at a different location will experience a shock similar to that described above for an ungrounded object. Mitigation for this problem is to ensure multiple grounds on fences or pipelines, especially those that are orientated parallel to a transmission line.

The proposed 115-kV transmission interconnections will be constructed in conformance with GO-95 and 8 California Code of Regulations (CCR) 2700 requirements. Therefore, hazardous shocks are unlikely to occur as a result of project construction or operation.

5.5.3 Aviation Safety

Federal Aviation Administration (FAA) Regulations, Part 77 establishes standards for determining obstructions in navigable airspace and sets forth requirements for notification of proposed construction. These regulations require FAA notification for any construction

over 200 feet in height above ground level. Notification is also required if the obstruction is less than the above-specified height falls within any restricted airspace in the approach to airports. The closest airport is Oakland International Airport approximately 34,000 feet to the east and therefore further than the 20,000 feet required for notification.

Based on the height of the transmission structures (42 feet maximum) FAA notification is not needed. Furthermore, there are a number of existing transmission lines in proximity that are of comparable or taller height. As a result of their location and height in relation to the above airfield, the structures of the proposed electrical transmission interconnection will pose no deterrent to aviation safety as defined in the FAA regulations.

5.5.4 Fire Hazards

The proposed 115-kV transmission interconnection will be designed, constructed, and maintained in accordance with CPUC General Orders that establish clearances from other natural and constructed structures as well as tree-trimming requirements to mitigate fire hazards. The Applicant will use trained and qualified maintenance personnel to maintain the interconnection corridor and immediate area of the switchyard in accordance with accepted industry practices that will include recognition and abatement of any fire hazards.

5.6 Applicable Laws, Ordinances, Regulations, and Standards

This section provides a list of applicable laws, ordinances, regulations, and standards (LORS) that apply to the proposed transmission line, substations and engineering.

5.6.1 Design and Construction

Table 5-1 lists the applicable LORS for the design and construction of the proposed transmission line and substations.

TABLE 5-1
Design and Construction LORS

LORS	Applicability	AFC Reference
GO-95, CPUC, "Rules for Overhead Electric Line Construction"	CPUC rule covers required clearances, grounding techniques, maintenance, and inspection requirements	Section 5.4
Title 8 CCR, Section 2700 et seq. "High Voltage Electrical Safety Orders"	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical installation and equipment to provide practical safety and freedom from danger	Section 5.2
GO-52, CPUC, "Construction and Operation of Power and Communication Lines"	Applies to the design of facilities to provide or mitigate inductive interference	Section 5.4
ANSI/IEEE 693, "IEEE Recommended Practices for Seismic Design of Substations"	Recommends design and construction practices	Section 5.2
IEEE 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Recommends clearance practices to protect persons outside the facility from electric shock	Section 5.3

TABLE 5-1
Design and Construction LORS

LORS	Applicability	AFC Reference
IEEE 998, "Direct Lightning Stroke Shielding of Substations"	Recommends protections for electrical system from direct lightning strikes	Section 5.3
IEEE 980, "Containment of Oil Spills for Substations"	Recommends preventions for release of fluids into the environment	Section 5.3

5.6.2 Electric and Magnetic Fields

The applicable LORS pertaining to EMF interference are tabulated in Table 5-2.

TABLE 5-2
Electric and Magnetic Field LORS

LORS	Applicability	AFC Reference
Decision 93-11-013, CPUC	CPUC position on EMF reduction	Section 5.5.2
GO-131-D, CPUC, "Rules for Planning and Construction of Electric Generation, Line, and Substation Facilities in California"	CPUC construction application requirements, including requirements related to EMF reduction	Section 5.2
ANSI/IEEE 644-1994, "Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines"	Standard procedure for measuring EMF from an electric line that is in service	Section 5.2

5.6.3 Hazardous Shock

Table 5-3 lists the LORS regarding hazardous shock protection that apply to the project.

TABLE 5-3
Hazardous Shock LORS

LORS	Applicability	AFC Reference
8 CCR 2700 et seq. "High Voltage Electrical Safety Orders"	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical equipment to provide practical safety and freedom from danger	Section 5.3
ANSI/IEEE 80, "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations	Section 5.3
NESC, ANSI C2, Section 9, Article 92, Paragraph E; Article 93, Paragraph C.	Covers grounding methods for electrical supply and communications facilities	Section 5.3

5.6.4 Communications Interference

The applicable LORS pertaining to communication interference are tabulated in Table 5-4.

TABLE 5-4
Communications Interference LORS

LORS	Applicability	AFC Reference
47 CFR 15.25, "Operating Requirements, Incidental Radiation"	Prohibits operations of any device emitting incidental radiation that causes interference to communications; the regulation also requires mitigation for any device that causes interference	Section 5.3
GO-52, CPUC	Covers all aspects of the construction, operation, and maintenance of power and communication lines and specifically applies to the prevention or mitigation of inductive interference	Section 5.3
CEC staff, Radio Interference and Television Interference (RI-TVI) Criteria (Kern River Cogeneration) Project 82-AFC-2, Final Decision, Compliance Plan 13-7	Prescribes the CEC's RI-TVI mitigation requirements, developed and adopted by the CEC in past citing cases	Section 5.3

5.6.5 Aviation Safety

Table 5-5 lists the aviation safety LORS that may apply to the proposed construction and operation of SFERP.

TABLE 5-5
Aviation Safety LORS

LORS	Applicability	AFC Reference
Title 14 CFR, Part 77, "Objects Affecting Navigable Airspace"	Describes the criteria used to determine whether a "Notice of Proposed Construction or Alteration" (NPCA, FAA Form 7460-1) is required for potential obstruction hazards	Section 5.5.3
FAA Advisory Circular No. 70/7460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting of obstructions as identified by FAA Regulations Part 77	Section 5.3.3
PUC, Sections 21656-21660	Discusses the permit requirements for construction of possible obstructions in the vicinity of aircraft landing areas, in navigable airspace, and near the boundary of airports	Section 5.5.3

5.6.6 Fire Hazards

Table 5-6 tabulates the LORS governing fire hazard protection for SFERP.

TABLE 5-6
Fire Hazard LORS

LORS	Applicability	AFC Reference
14 CCR Sections 1250-1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and electric conductor clearance standards, and specifies when and where standards apply	Section 5.3.5
ANSI/IEEE 80, "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations	Section 5.3.5
GO-95, CPUC, "Rules for Overhead Electric Line Construction," Section 35	CPUC rule covers all aspects of design, construction, operation, and maintenance of electrical transmission line and fire safety (hazards)	Section 5.3.5

5.6.7 Jurisdiction

Table 5-7 identifies national, state, and local agencies with jurisdiction to issue permits or approvals, conduct inspections, and/or enforce the above-referenced LORS. Table 5-7 also identifies the associated responsibilities of these agencies as they relate to the construction and operation of SFERP.

TABLE 5-7
Jurisdiction

Agency or Jurisdiction	Responsibility
CEC	Jurisdiction over new transmission lines associated with thermal power plants that are 50 MW or more (Public Resources Code [PRC] 25500)
CEC	Jurisdiction of lines out of a thermal power plant to the interconnection point to the utility grid (PRC 25107)
CEC	Jurisdiction over modifications of existing facilities that increase peak operating voltage or peak kilowatt capacity 25 percent (PRC 25123)
FAA	Establishes regulations for marking and lighting of obstructions in navigable airspace (AC No. 70/7460-1G)
Local Electrical Inspector	Jurisdiction over safety inspection of electrical installations that connect to the supply of electricity (NFPA 70)
City and County of San Francisco	Establishes and enforces zoning regulations for specific land uses. Issues variances in accordance with zoning ordinances
	Issues and enforces certain ordinances and regulations concerning fire prevention and electrical inspection



FIGURE 5-1
LOCATION OF SFERP AND PG&E POTRERO SUBSTATION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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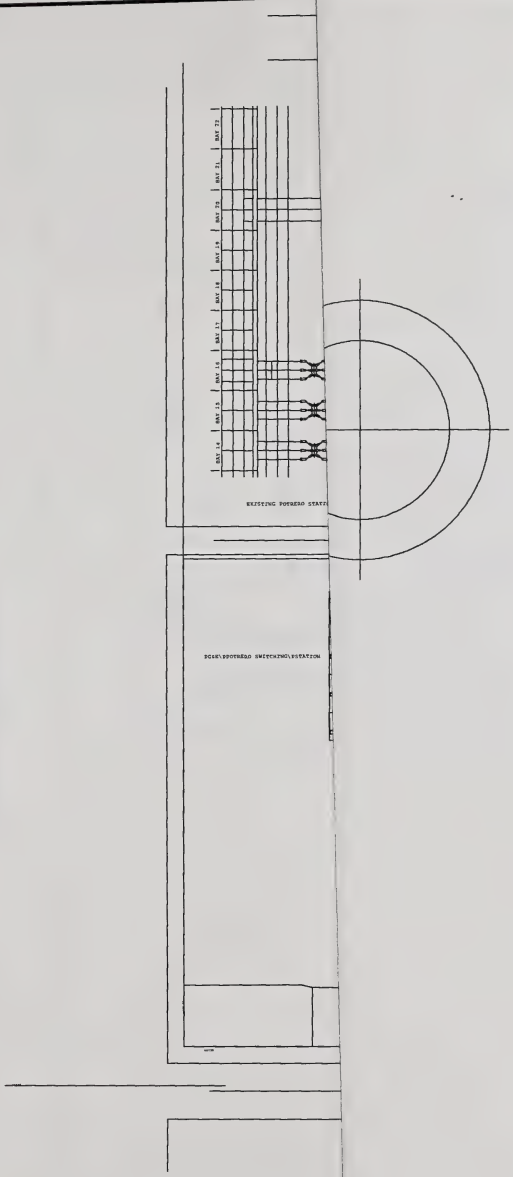


FIGURE 5-2
SITE LAYOUT WITH TRANSMISSION LINES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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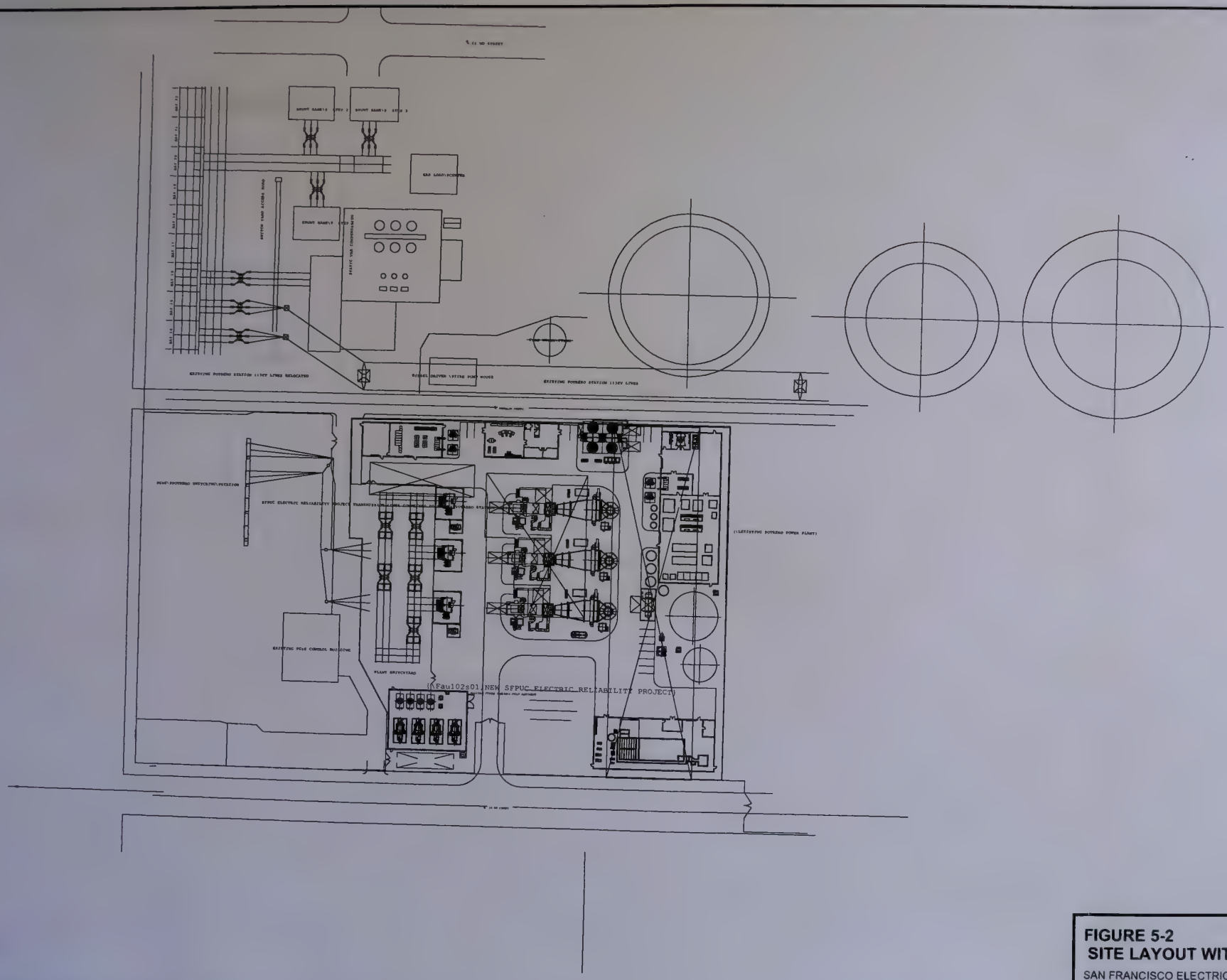


FIGURE 5-2
SITE LAYOUT WITH TRANSMISSION LINES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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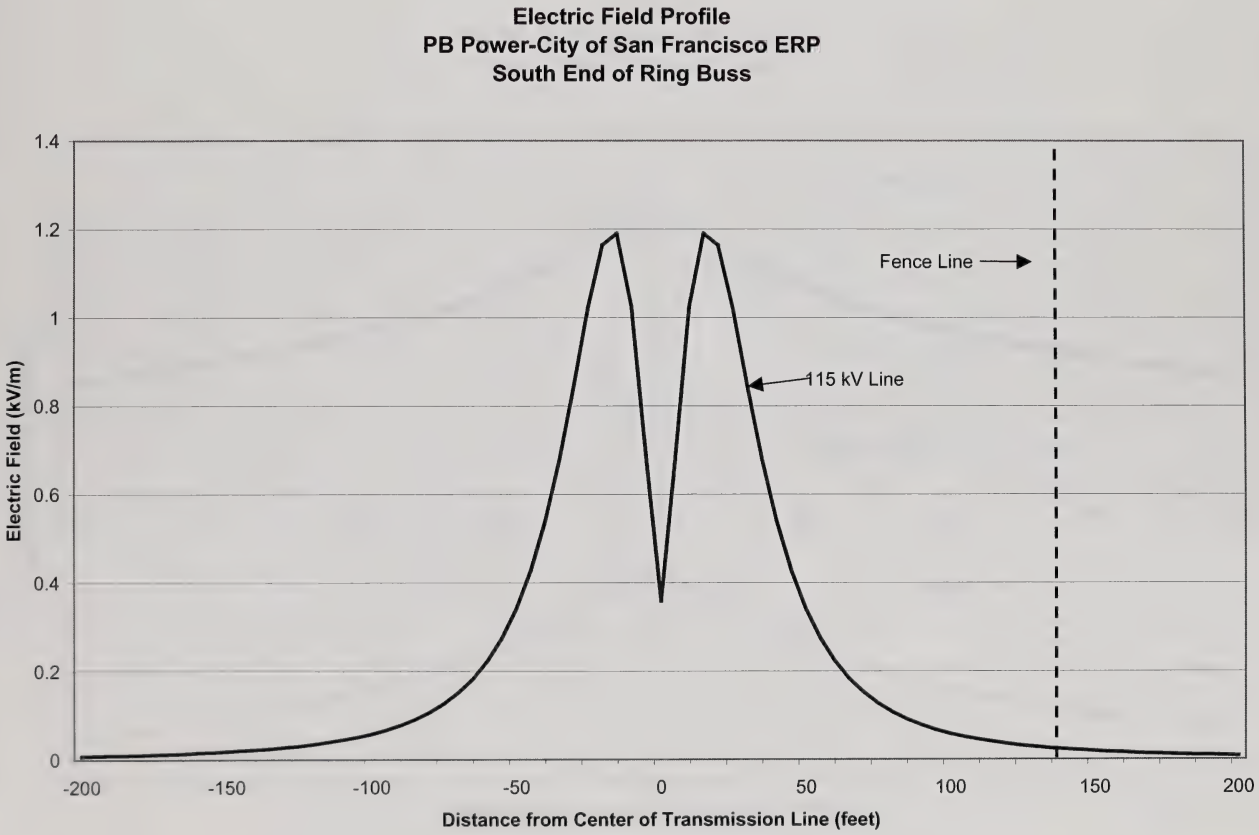


FIGURE 5-3
ELECTRIC FIELD FOR 115kV BUS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_22 (3/8/04)

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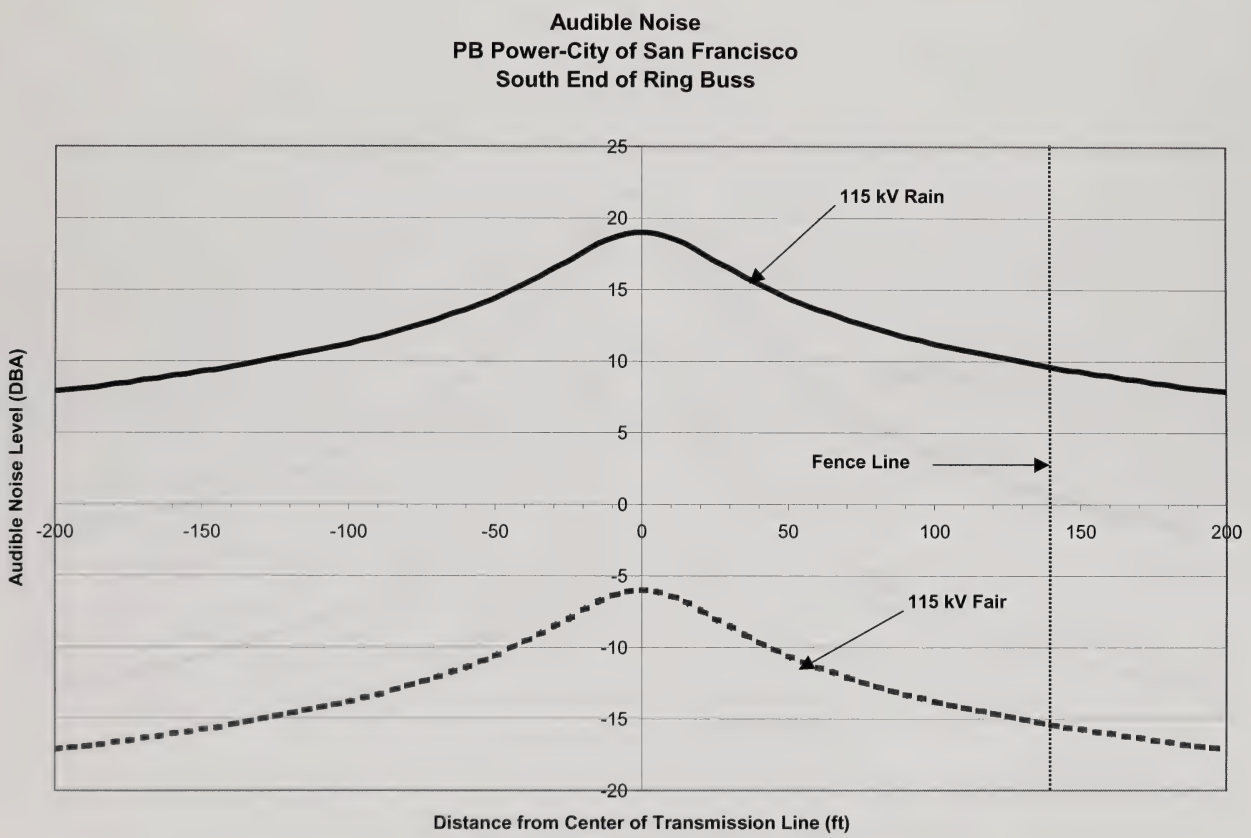


FIGURE 5-4
AUDIBLE NOISE PRODUCED FOR 115kV BUS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_12 (3/8/04)

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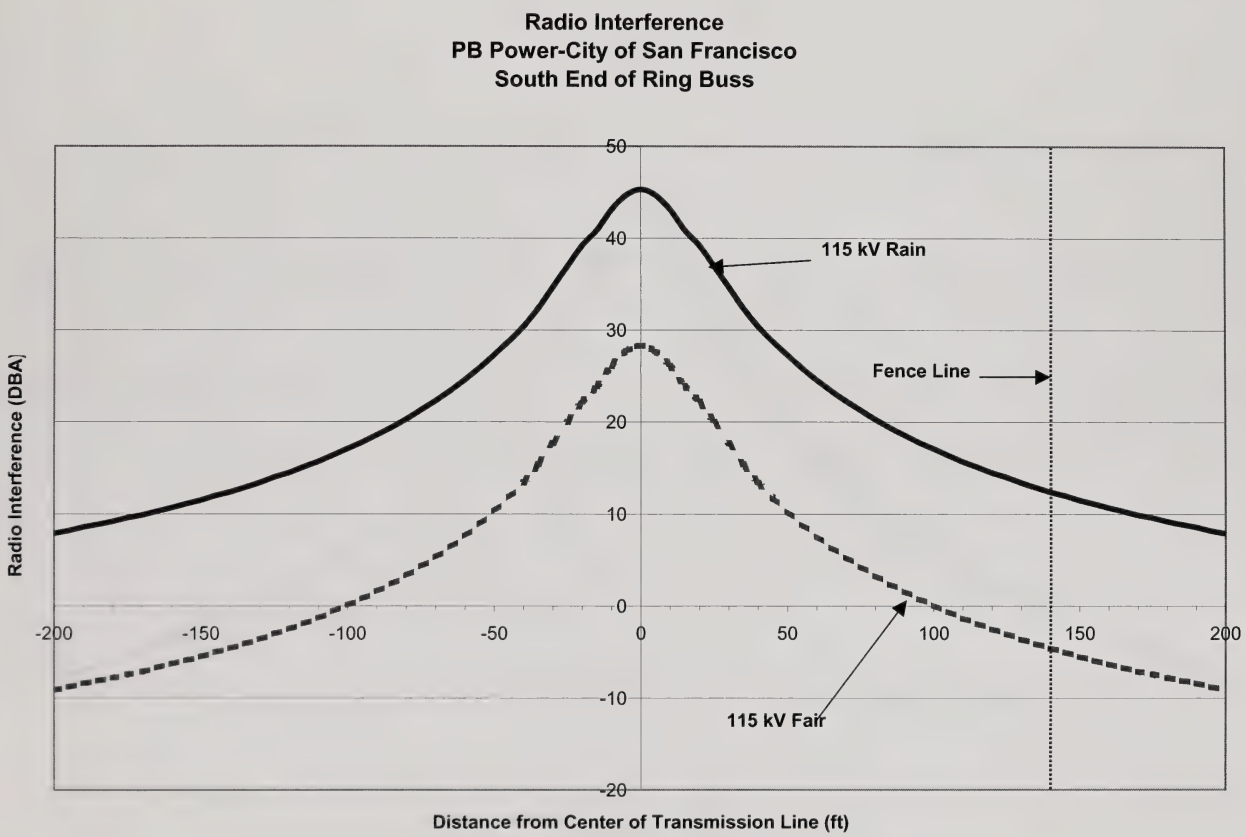


FIGURE 5-5
RADIO INTERFERENCE FOR 115kV BUS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_13 (3/8/04)

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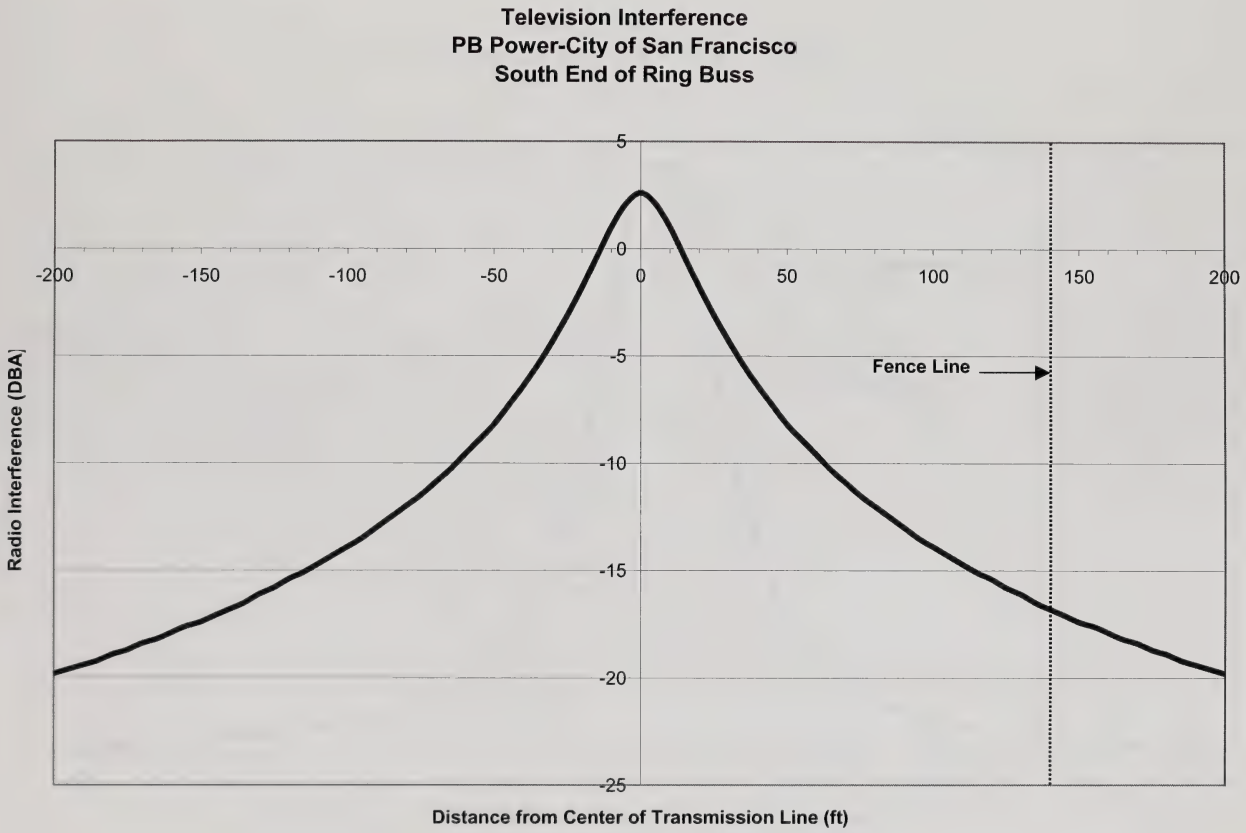


FIGURE 5-6
TELEVISION INTERFERENCE FOR 115kV BUS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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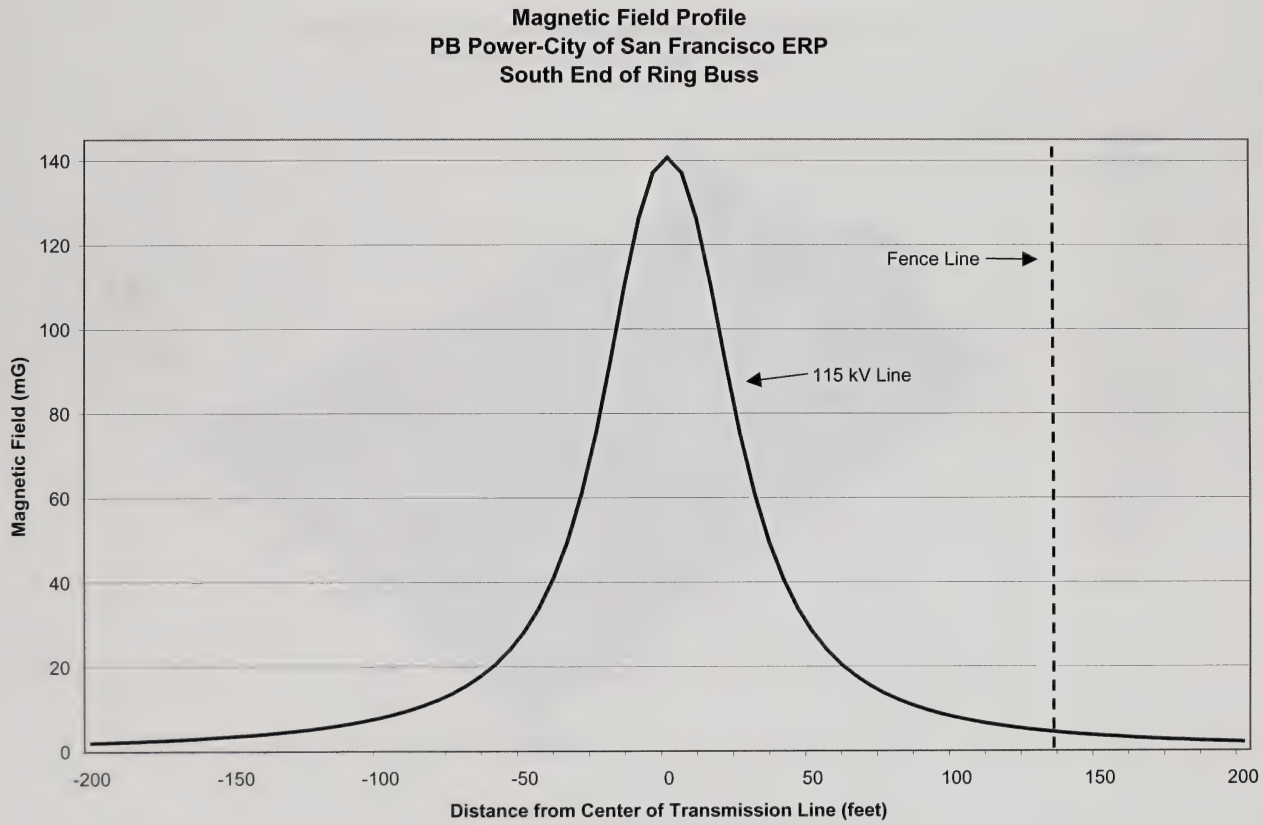


FIGURE 5-7
MAGNETIC FIELD CALCULATIONS FOR 115kV BUS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_15 (3/8/04)

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Magnetic Field for San Francisco Public Utilities Commission
Electric Reliability Project - 3 Units Simple Cycle
(milli Gauss)

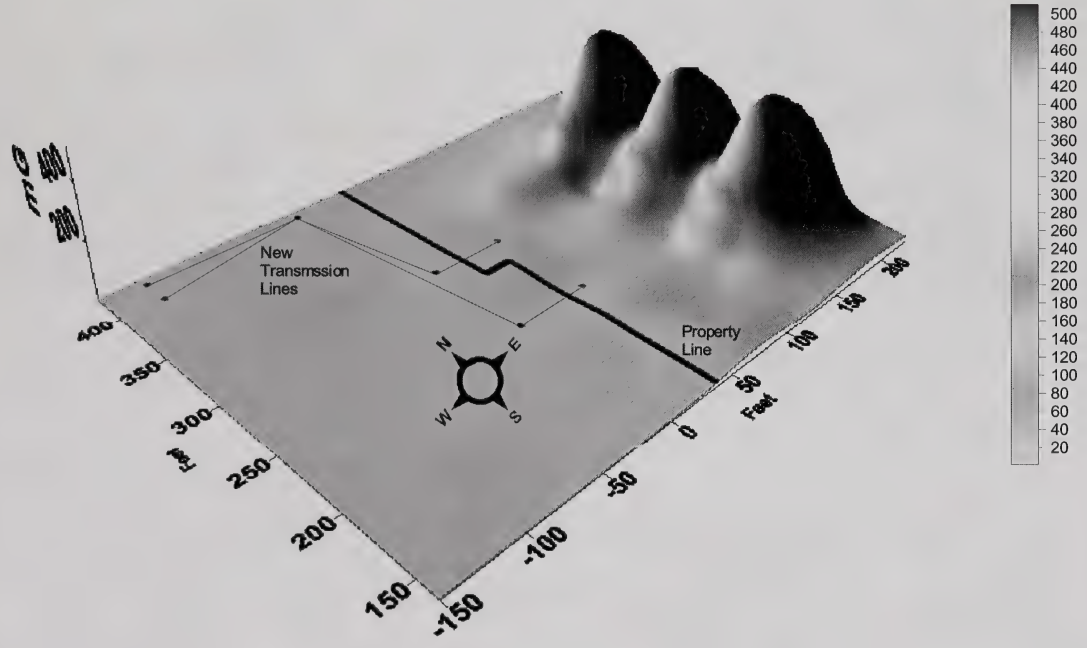


FIGURE 5-8
MAGNETIC FIELD OF GENERATOR BUSSES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_23 (3/5/04)

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SECTION 6.0

Natural Gas Supply

SECTION 6.0

Natural Gas Supply

6.1 Introduction

This section discusses the natural gas supply for the San Francisco Electric Reliability Project (SFERP). Subsection 6.2 describes the proposed natural gas supply pipeline. The gas supply pipeline construction methods and metering station are described in Subsection 6.3. Pipeline operations are described in Subsection 6.4. Natural gas will be obtained from the Pacific Gas & Electric Company's (PG&E) transmission pipeline header at the San Francisco Load Center, located west of the project site adjacent to the PG&E Potrero substation (Potrero Substation) (see Appendix 6A). This header is served by three PG&E gas pipelines, lines 101, 109, and 132, and is therefore, a very reliable connection location. A new 12-inch-diameter pipeline will be constructed from the PG&E tap point to the SFERP site. A meter station will be installed at the SFERP site.

6.2 Proposed Route

The proposed pipeline is approximately 250 feet long. The pipeline would run east adjacent to 23rd Street to the SFERP metering station located on the southern side of the project site, adjacent to 23rd Street (see Figure 6-1 at the end of this section).

This route is primarily on PG&E property until it connects with SFERP. The specific location of the pipeline will be determined during detail design based upon the avoidance of any existing pipelines or other buried utilities.

Construction primarily will be open trench with a construction corridor of approximately 50 feet. The construction corridor will be located in 23rd Street, or on PG&E property.

No other alternative routes were evaluated due to the proximity of the PG&E San Francisco Load Center to the SFERP site.

6.3 Construction Practices

6.3.1 Gas Pipeline

The natural gas pipeline will be constructed with a minimum of one crew working continuously along the route, with construction of the entire pipeline requiring a peak workforce of approximately 8 workers. Workers will park their vehicles in the PG&E parking area in the Potrero substation. Most major pieces of construction equipment will remain along the route during construction. Besides providing worker parking, the Potrero substation and load center will serve as the location for storing pipe and other pipeline construction materials. Pipeline construction will take approximately 1.5 months and is expected to begin toward the end of 2005 following the start of project construction.

The pipeline will be constructed of alloyed carbon steel in accordance with the American Petroleum Institute (API) specification for gas pipeline. The pipe will have factory-applied corrosion protection coating. Joints would be welded, inspected using x-ray, and wrapped with a corrosion protection coating.

The construction of the natural gas pipeline will consist of the following:

1. **Trenching-width** depends on the type of soils encountered and requirements of the governing agencies. The optimal trench will be approximately 18 inches wide and 48 inches deep. If loose soil is encountered, a trench up to 8 feet wide at the top and 2 feet wide at the bottom may be required. The pipeline will be buried to provide a minimum cover of 36 inches. The excavated soil will be piled on one side of the trench and used for backfilling after the pipe is installed. The pipeline will be installed through trenching at all locations except where boring or directional drilling is required to pass beneath other buried utilities.

2. **Stringing** consists of trucking lengths of pipe to the ROW and laying them on wooden skids beside the open trench.

3. **Installation** consists of bending, welding, and coating the weld-joint areas of the pipe after it has been strung, padding the ditch with sand or fine spoil, and lowering the pipe string into the trench. Bends will be made using a cold bending machine or shop-fabricated as required for various changes in bearing and elevation. Welding will meet the applicable API standards and will be performed by qualified welders. Welds will be inspected in accordance with API Standard 1104. Welds will undergo 100 percent radiographical inspection by an independent, qualified radiography contractor. All coating will be checked for holidays (i.e., defects) and will be repaired before lowering the pipe into the trench.

4. **Backfilling** consists of returning spoil back into the trench around and on top of the pipe, ensuring that the surface is returned to its original grade or level. The backfill will be compacted to protect the stability of the pipe and to minimize subsequent subsidence.

5. **Plating** consists of covering any open trench in areas of foot or vehicle traffic at the end of a workday. Plywood plates will be used in areas of foot traffic and steel plates will be used in areas of vehicle traffic to ensure public safety. Plates will be removed at the start of each workday. Efforts will be made to minimize the length of open trench along the route.

6. **Hydrostatic testing** consists of filling the pipeline with potable water, venting all air, increasing the pressure to the specified code requirements, and holding the pressure for a period of time. After hydrostatic testing, the test water will be analyzed for pH and total dissolved solids (TDS) and discharged to the City's combined sewer system, unless the analysis shows that the water's pH and/or TDS exceeds the City's discharge criteria. In this case the water would be trucked to an appropriate treatment or disposal facility. Temporary approvals for test water use and discharge will be obtained, by the construction contractor, as required.

7. **Cleanup** consists of restoring the surface of the roadway or right-of-way (ROW) by removing any construction debris, grading to the original grade and contour, and revegetating or repairing where required.

8. **Commissioning** consists of cleaning and drying the inside of the pipeline, purging air from the pipeline, and filling the pipeline with natural gas.

9. **Safety** consists of using PG&E's standard safety plan for the project. This plan addresses specific safety issues, traffic control, working along city streets, and other areas, as required by permits.

6.3.2 Metering Station

A gas-metering station will be required at the SFERP site to measure and record gas volumes. In addition, facilities will be installed to regulate the gas pressure and to remove any liquids or solid particles. The metering station will require an area of approximately 25 feet by 70 feet on the SFERP site.

Construction activities related to the metering station will include grading a pad and installing above- and belowground gas piping, metering equipment, gas conditioning, pressure regulation, and possibly pigging facilities. A distribution power line will also be installed to provide power for metering station operation lighting, communication equipment, and perimeter chain-link fencing for security.

6.4 Pipeline Operations

The proposed natural gas supply pipeline will be designed, constructed, and operated in accordance with 49 CFR 192 and CPUC General Order No. 112. Specifically, the pipeline will be designed in accordance with the standards required for gas pipelines in populated areas. It will be installed with a minimum of 36 inches of cover as required by Federal Code.

PG&E's standard operations and maintenance plan will be in place, addressing both normal procedures and conditions and any upset or abnormal conditions that could occur. Periodic leak surveys and cathodic protection surveys will be performed along the pipeline, as required by 49 CFR 192. The pipeline will be continuously protected by a cathodic protection system. PG&E's standard emergency plan will provide prompt and effective responses to upset conditions detected along the pipeline or reported by the public. This plan is reviewed with local agencies annually.

PG&E has a proactive damage prevention program in place that will be applied to the pipeline. Markers identifying the location of the pipeline will be placed at all road crossings. The markers will identify a toll-free number to call before any excavation in the vicinity of the pipeline.

Isolation block valves will be installed at both ends of the pipeline. These valves will be manually controlled, lockable, gear-operated ball valves. PG&E will own and operate the metering facility to measure the gas supply to SFERP. A pipeline Supervisory Control and Data Acquisition (SCADA) system will provide flow rate and pressure data to PG&E and SFERP. Communication with PG&E gas line operations will be by dedicated telephone lines or other means, such as Cellular Digital Pocket Data (CDPD).

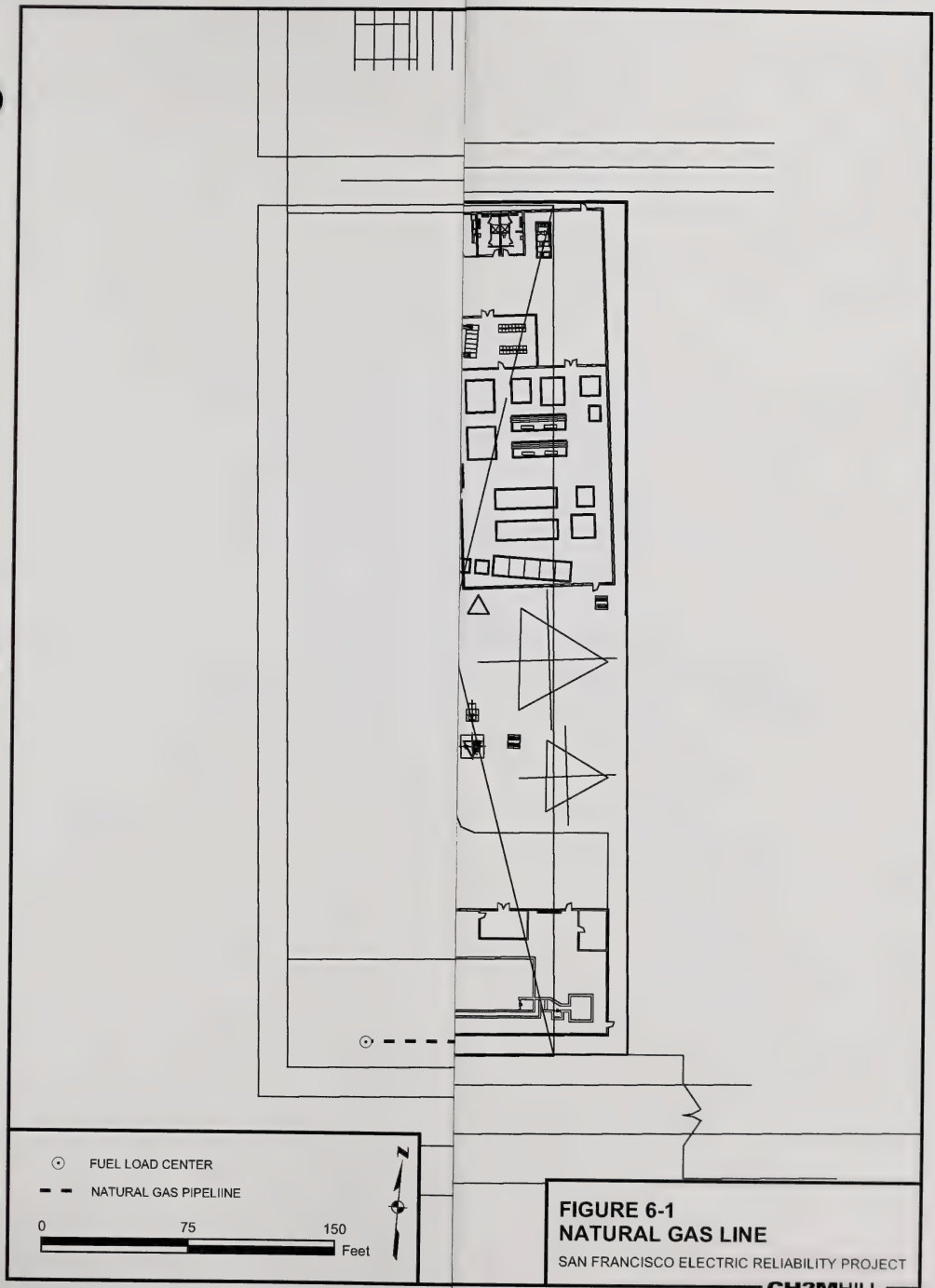


FIGURE 6-1
NATURAL GAS LINE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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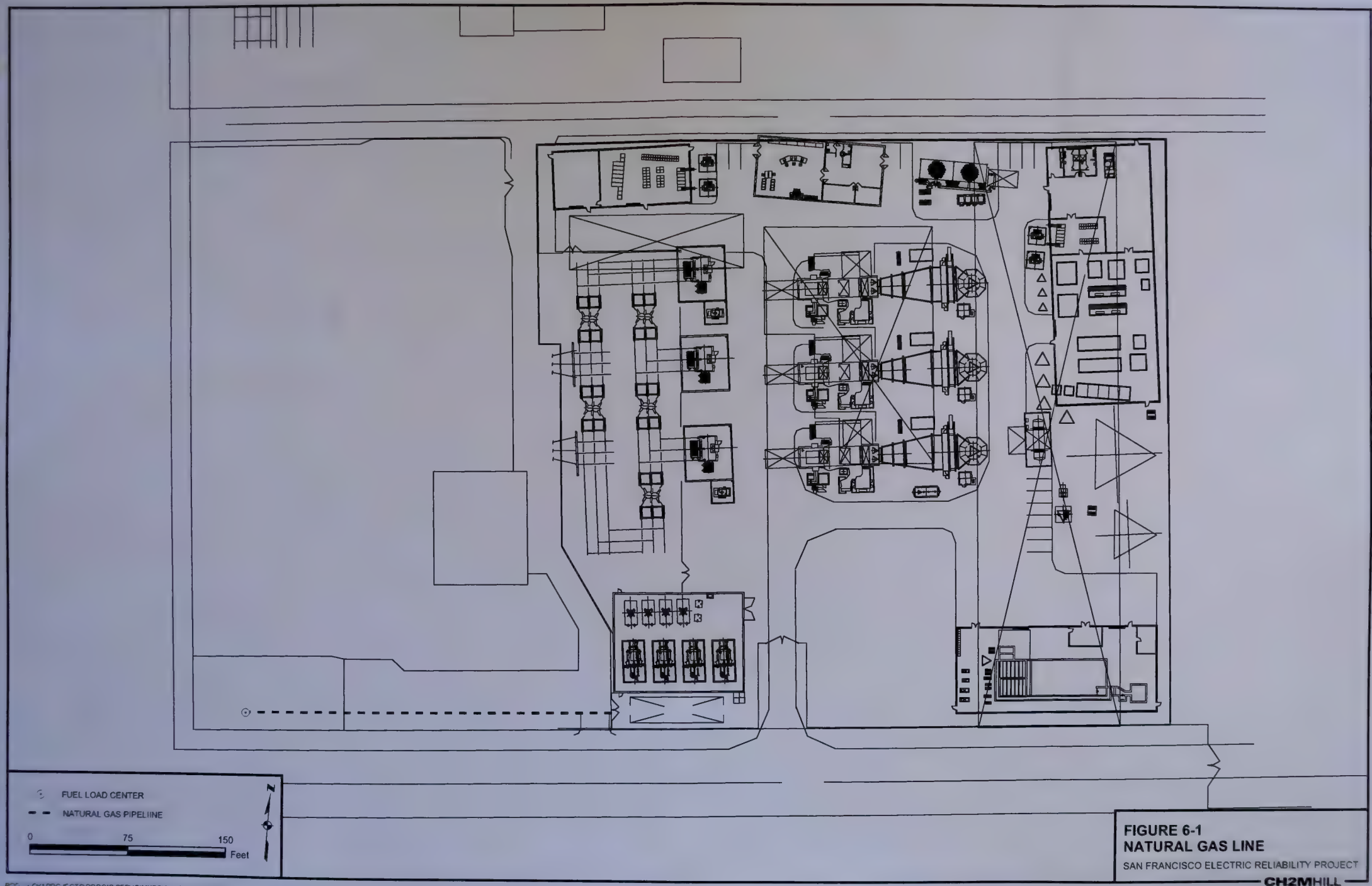


FIGURE 6-1
NATURAL GAS LINE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SECTION 7.0

Water Supply Pipelines

SECTION 7.0

Water Supply Pipelines

7.1 Introduction

This section describes the water supply pipeline route for the recycled and domestic water lines. The source of the water, its quality, and potential environmental impacts are discussed in Subsection 8.14, Water Resources.

Subsection 7.2 discusses the process water supply pipeline. Subsection 7.3 discusses the potable water line for potable supply, fire protection, and emergency supply. Subsection 7.4 discusses the pipeline construction practices.

7.2 Process Supply Pipeline

7.2.1 Process Water Supply

To provide a source of process water for the water treatment plant at the SFERP site, the City's combined sewer system will be intercepted at a collection station near Marin Street. A new underground pump station will be constructed on a parcel located on Marin Street. The pump station will include infrastructure to remove floatable matter and large debris prior to discharge into the process water pipeline. Excess flow and debris will be returned to the combined sewer system.

7.2.3 Pipeline Alignment

The initial reach of the pipeline will be constructed along Marin Street. It will extend approximately 80 feet, and will be installed using open trench excavation methods. The second reach of the process water pipeline will be constructed within an existing collection box, which is part of the storage/transport system that captures stormwater runoff. At locations where there is insufficient room within the collection box, the pipeline will be constructed through open-trenching or a trenchless method, such as jack and bore or micro-tunneling. This portion of the alignment extends north from Marin Street along Mississippi Street for about 480 feet, and then east on Cesar Chavez Street for about 1,400 feet. The existing collection box terminates near the intersection of Cesar Chavez Street and Indiana Street. The third and final portion of the pipeline will run about 560 feet east on Cesar Chavez Street, then 1,880 feet north on Tennessee Street and then 1,360 feet east on 23rd Street to the SFERP water treatment facility inlet structure, located on the southern boundary of the project site. This third portion of the pipeline will be installed using open trench excavation methods, or trenchless methods, where necessary.

The pipelines may have to be installed across Cesar Chavez Street using trenchless methods, due to traffic concerns and many existing utility crossings. Between Cesar Chavez and Tennessee Streets, the pipeline will be located to avoid all known utilities. A pile-supported 54-inch sewer will be crossed at 26th Street. Record drawings indicate that this sewer is deep and will be easy to cross. Along the remainder of the alignment on Tennessee Street, an

18-inch sewer line and an 8-inch water line will have to be crossed at 25th Street. A 12-inch sewer line at 24th Street will also be crossed. Along 23rd Street, the alignment will stay on the south side to avoid water lines and other utilities located on the north side of the street. A 3-by-4-foot stormwater line will have to be crossed at Third Street in addition to a future light rail right-of-way (presently under construction). Therefore, this crossing under Third Street will have to be installed using trenchless methods.

7.3 Potable Water Pipeline

Potable water will be supplied to SFERP to meet minor potable water needs, fire protection demands, and emergency cooling and process backup supplies, as described in Subsection 8.14, Water Resources. The potable water source is the City's potable water distribution system, which provides Hetch Hetchy water treated at the San Francisco Public Utilities Commission (SFPUC) Harry Tracy Water Treatment Plant, located on Crystal Springs Road in San Bruno. An existing potable water pipeline of sufficient capacity is located at the corner of Illinois Street and 23rd Street, which will supply water to the SFERP.

7.4 Construction Practices

Construction of the process water supply pipeline is expected to occur during months 4 through 7 of project construction. Total construction time is expected to be approximately 4 months.

The water pipelines will be constructed with one crew ("spread") working continuously along the pipeline right-of-way (ROW), performing pipe installation in the storage/transport and in open trenches. In addition, a second crew will perform microtunneling operations at the necessary locations. Workers will park along the pipeline corridor, or at designated parking areas and be transported to the work site. The pipeline corridor will be accessed from existing roads. Most major pieces of construction equipment may remain along the alignment over the course of construction. Piping will be stored in the plant laydown areas or along the pipeline ROW. Construction will be undertaken in accordance with an environmental mitigation plan prepared for the project.

The construction of the wastewater pipelines will consist of the following activities:

- **Trenching**—It is expected that the pipeline can be installed in a relatively shallow trench, with a total excavation depth of approximately 7 feet. The width would be approximately 5 feet with allowance for clearance on both sides of the pipe and trench shoring and sheeting. Trench width will depend on the type of soils encountered and slope required by OSHA regulations. Trench depth will be sufficient to meet the requirements of the codes and agency having jurisdiction. Moreover, the pipeline will be buried to provide a minimum cover of 3 feet.

- **Jack and Bore/Micro-tunneling**—Jack and bore or micro-tunneling will be used at locations within the open-cut trench alignment reaches where there are facilities such as large box culverts without adequate clearance above, or to cross the future light rail tracks. Both of these methods will require a jacking pit and a receiving pit. The jacking pit would need to be approximately 30 feet long and 15 feet wide. At these crossings, a

casing pipe would be installed by jack and bore or micro-tunneling. The pipes and any conduits for fiber optic cables will be bundled together with spacers and skids and then pushed into the empty casing. The excess material from this operation may be contaminated and will be hauled to an appropriate area for disposal. The use of the jack and bore or microtunneling method will be dependent on the subsurface conditions.

- **Installation in the Collection Box** — The second portion of the pipeline will be installed and encased in concrete within the existing collection box and above the existing concrete-encased sewer lines. The installation within the collection box requires safety procedures specific to work within confined space. Prior to actual work within the structure, locations for discharge need to be identified. Temporary barriers at all inlets will be constructed to prevent flow into the structure during work. Prior to work within the structure, it will be pressure washed and ventilated, and proper lighting will be installed. Access holes will be cut into the top of the collection box near bends in the alignment so equipment and materials can be lowered into it. At each of these locations, temporary stairs will be placed for construction worker access.

- **Open-Trench Installation** — Installation of the water pipelines will consist of lowering the pipe string into the trench.

- **Stringing** — Stringing will consist of trucking lengths of pipe to the alignment corridor and laying them on wooden skids beside the open trench.

- **Backfilling** — It is anticipated that the excavated material will have unsuitable engineering properties to be used for backfill, and will therefore be hauled to an appropriate area for disposal. The trench may be backfilled with imported granular material or a flowable material such as controlled low strength material (CLSM). If CSLM were used, the trench may be narrowed to approximately 4 feet in width because of the backfilling characteristic of CSLM. Backfilling will consist of placing the selected fill material into the trench around and on top of the pipe, ensuring that the surface is returned to its original grade or level. The backfill will be compacted to protect the stability of the pipe and to minimize subsequent subsidence.

- **Plating** — Plating will consist of covering any open trench in areas of foot or vehicle traffic at the end of a workday. Plywood plates will be used in areas of foot traffic and steel plates will be used in areas of vehicle traffic to ensure public safety. Plates will be removed at the start of each workday. Efforts will be made to minimize the length of open trench along the alignment.

- **Hydrostatic Testing** — Hydrostatic testing will consist of filling the pipeline with water, venting all air, increasing the pressure to the specified code requirements, and holding the pressure for a period of time. After hydrostatic testing, the test water will be analyzed for pH and total dissolved solids (TDS) and discharged to City's combined sewer system, unless the analysis shows that the water's pH and TDS exceeds the City's discharge criteria. In this case the water would be trucked to an appropriate disposal facility. Temporary approvals for test water use and discharge will be obtained, as required by the construction contractor.

- **Cleanup**—Cleanup will consist of restoring the surface of the backfilled trench by removing any construction debris, grading to the original grade and contour, and revegetating and repairing where required.
- **Safety**—A construction safety plan will be prepared for the project. This plan will address specific safety issues, such as working in an active railroad ROW, traffic control, working along traveled city or county streets, and other areas as required by permits.

SECTION 8.0

Environmental Information

SECTION 8.0

Environmental Information

The following subsections, 8.1 through 8.16, provide the environmental information required for the Application:

8.1 Air Quality
8.2 Biological Resources
8.3 Cultural Resources
8.4 Land Use
8.5 Noise
8.6 Public Health
8.7 Worker Health and Safety
8.8 Socioeconomics
8.9 Agriculture and Soils
8.10 Traffic and Transportation
8.11 Visual Resources
8.12 Hazardous Materials Handling
8.13 Waste Management
8.14 Water Resources
8.15 Geologic Hazards and Resources
8.16 Paleontological Resources

SUBSECTION 8.1

Air Quality

8.1 Air Quality

The proposed project consists of the installation and operation of three simple-cycle LM6000PC combustion turbines at the corner of Illinois Street and 23rd Street in the Potrero District of the City of San Francisco. The project will include one small 2-cell cooling tower to provide inlet air chilling as necessary to maintain turbine output or when auxiliary cooling is necessary. The nominal plant output will be 145 megawatts (MW).

This section of the AFC describes existing air quality conditions, maximum potential impacts from the project, and mitigation measures that keep these impacts below thresholds of significance. The project will use the latest, most efficient peaking generation technology to generate electricity in a manner that will minimize the amount of fuel needed, emissions of criteria pollutants, and potential effects on ambient air quality.

Other beneficial environmental aspects of the project that minimize adverse air quality include the following:

- Clean-burning natural gas as fuel.
- Selective catalytic reduction (SCR) and combustion turbine water injection to minimize NO_x emissions.
- Oxidation catalysts to reduce emissions of carbon monoxide and hazardous air pollutants.
- Appropriately sized stacks to reduce ground-level concentrations of exhaust constituents.

This section presents the methodology and results of the air quality analyses performed to assess potential impacts associated with air emissions from the project. Potential public health risks posed by emissions of non-criteria pollutants are also addressed in Section 8.6 (Public Health).

Subsection 8.1.1 presents the air quality setting, including geography, topography, climate and meteorology. Subsection 8.1.2 provides an overview of air quality standards and health effects. Subsection 8.1.3 discusses the criteria pollutants and existing air quality in the vicinity of the proposed project. The affected environment is analyzed in Subsection 8.1.4, and air quality regulatory agencies relevant to the project are identified; the LORS that can affect the project and project conformance are also identified in Subsection 8.1.4. Subsection 8.1.5 discusses the environmental consequences of emissions from the project and presents an overview of approaches for estimating facility impacts, modeling, and analysis. The screening health risk assessment, visibility screening analysis, and construction impacts analysis are also discussed. Subsection 8.1.6 discusses compliance with LORS applicable to the project. A protocol for assessing cumulative impacts is presented in Subsection 8.1.7. Mitigation for project air quality impacts is discussed in Subsection 8.1.8. A list of references used in preparing this section is provided in Subsection 8.1.9.

8.1.1 Air Quality Setting

8.1.1.1 Geography and Topography

The project will be located on the east side of San Francisco, within the existing Mirant Potrero Power Plant. The project site is at an elevation of approximately 26 feet above sea level. The nearest residences are located within approximately 600 feet of the project site. San Francisco Bay lies immediately east of the site.

8.1.1.2 Climate and Meteorology

The overall climate at the project site is dominated by the semi-permanent eastern Pacific high pressure system centered off the coast of California. This high pressure system is centered between the 140° west (W) and 150° W meridians, and oscillates in a north-south direction. Its position governs California's weather. In the summer, the high-pressure system moves to its northernmost position, which results in strong northwesterly flow and negligible precipitation. A thermal low pressure area from the Sonoran-Mojave Desert also causes air to flow onshore over the San Francisco Bay area much of the summer.

In the winter, the high pressure system moves southwestward toward Hawaii, which allows storms originating in the Gulf of Alaska to reach northern California, bringing wind and rain. About 80 percent of the region's annual rainfall of approximately 19.3 inches (City of San Francisco, 2004) occurs between November and March (U.S. Department of Commerce, 1959). During the winter rainy periods, inversions are weak or nonexistent, winds are often moderate, and the air pollution potential is very low. During summer and fall, when the Pacific high pressure system becomes dominant, inversions become strong and often are surface-based; winds are light and the pollution potential is high. These periods are often characterized by winds that flow out of the Central Valley into the Bay Area and often include morning and evening fog.

Temperature, wind speed, and direction data have been recorded at a meteorological monitoring station at the nearby Potrero Power Plant at a station operated by PG&E in 1992. The average annual temperature is 62 degrees Fahrenheit (°F). The average July temperature is 64°F; winter temperatures average 56°F in January (City of San Francisco, 2004).

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the topography of the air basin, and local meteorological conditions. In the project area, stable atmospheric conditions and light winds can provide conditions for pollutants to accumulate in the air basin when emissions are produced. The predominant winds in California are shown in Figures 8.1-1 through 8.1-4 (all figures are at the end of this subsection). As indicated in the figures, winds in California generally are light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

Wind patterns at the project site can be seen in Figures 8.1-5a through 8.1-5e, which show quarterly and annual wind roses for meteorological data collected at the Potrero Power Plant meteorological station during 1992. Wind frequency distribution tables are provided in Appendix 8.1. These wind roses show that the winds are persistent (less than 1 percent calm conditions) and on an annual basis, predominantly from the west through the west-southwest (almost half the time). Winds are predominantly from the north and south during the winter months.

The mixing heights of the area are affected by the eastern Pacific high pressure system and marine influences. Often, the base of the inversion is found at the top of a layer of marine air, because of the cooler nature of the marine environment. Smith et al. (1984) reported that at Oakland, the nearest upper-level meteorological station (located approximately 10 miles east-southeast of the project site), 50th percentile morning mixing heights for the period 1979-1980 were on the order of 1,770 feet (530 to 550 meters) in summer and fall, and 3,600 to 3,900 feet (1,100 to 1,200 meters) in winter and spring. The 50th percentile afternoon mixing heights ranged from 2,150 and 3,030 feet (660 to 925 meters) in summer and fall, and over 3,900 feet (over 1,200 meters) in winter and spring. Such mixing heights provide generally favorable conditions for the dispersion of pollutants. Inland areas, where the marine influence is weaker, often experience strong ground-based inversions during cold weather periods. These inversions inhibit dispersion of low-lying sources of air pollution, such as cars, trucks and buses, and can result in high pollutant concentrations.

8.1.2 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (USEPA) has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead. Areas with air pollution levels above these standards are considered "nonattainment areas" subject to planning and pollution control requirements that are more stringent than standard requirements.

In addition, the California Air Resources Board (CARB) has established standards for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). For some pollutants there is more than one air quality standard, reflecting both short-term and long-term effects. Table 8.1-1 presents the NAAQS and California ambient air quality standards for selected pollutants. The California standards are generally set at concentrations much lower than the federal standards and in some cases have shorter averaging periods.

USEPA's new NAAQS for ozone and fine particulate matter went into effect on September 16, 1997. For ozone, the previous 1-hour standard of 0.12 ppm was replaced by an 8-hour average standard at a level of 0.08 ppm. Compliance with this standard will be based on the 3-year average of the annual 4th-highest daily maximum 8-hour average concentration measured at each monitor within an area.

TABLE 8.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Ozone	1 hour	0.09 ppm	0.12 ppm
	8 hours	–	0.08 ppm (3-year average of annual 4th-highest daily maximum)
Carbon Monoxide	8 hours	9.0 ppm	9 ppm
	1 hour	20 ppm	35 ppm
Nitrogen Dioxide	Annual Average	–	0.053 ppm
	1 hour	0.25 ppm	–
Sulfur Dioxide	Annual Average	–	80 $\mu g/m^3$ (0.03 ppm)
	24 hours	0.04 ppm (105 $\mu g/m^3$)	365 $\mu g/m^3$ (0.14 ppm)
	3 hours	–	1300* $\mu g/m^3$ (0.5 ppm)
	1 hour	0.25 ppm	–
Suspended Particulate Matter (10 Micron)	Annual Arithmetic Mean	20 $\mu g/m^3$	50 $\mu g/m^3$
	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$
Suspended Particulate Matter (2.5 Micron)	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$ (3-year average)
	24 hours	–	65 $\mu g/m^3$ (3-year average of 98th percentiles)
Sulfates	24 hours	25 $\mu g/m^3$	–
Lead	30 days	1.5 $\mu g/m^3$	–
	Calendar Quarter	–	1.5 $\mu g/m^3$
Hydrogen Sulfide	1 hour	0.03 ppm	–
Vinyl Chloride	24 hours	0.010 ppm	–
Visibility Reducing Particles	8 hours (10am to 6pm PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	–

* This is a national secondary standard, which is designed to protect public welfare.

The NAAQS for particulates were revised in several respects. First, compliance with the current 24-hour PM_{10} standard will now be based on the 99th percentile of 24-hour concentrations at each monitor within an area. Two new $PM_{2.5}$ standards were added: a standard of 15 $\mu g/m^3$, based on the 3-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 $\mu g/m^3$, based on the 3-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area. Finally, the state adopted a new, lower annual PM_{10} standard of 20 $\mu g/m^3$.

8.1.3 Existing Air Quality

To characterize existing air quality at the project site, ambient air quality readings were taken from a nearby air monitoring station on Arkansas Street, San Francisco. The station, which is less than 1.5 miles northwest of the project site, is operated by the BAAQMD. This station was used because of its proximity to the project site and because it records area-wide ambient conditions rather than the localized impacts of any particular facility (A more extensive discussion of why the data from these stations are considered to be representative of air quality in the vicinity of the proposed project is provided in Section 8.1.5.3.1). All ambient air quality data presented in this section were taken from CARB and USEPA publications and data sources.

8.1.3.1 Ozone

Ozone is generated by a complex series of chemical reactions between precursor organic compounds (POC) and oxides of nitrogen (NO_x) in the presence of ultraviolet radiation. Ambient ozone concentrations follow a seasonal pattern: higher in the summertime and lower in the wintertime. At certain times, the general area can provide ideal conditions for the formation of ozone due to the persistent temperature inversions, clear skies, mountain ranges that trap the air mass, and exhaust emissions from millions of vehicles and stationary sources. Based upon ambient air measurements at stations throughout the area, the Bay Area Air Basin is classified as a nonattainment area for ozone.

Maximum ozone concentrations at the San Francisco station usually are recorded during the summer months. Table 8.1-2 shows the annual maximum hourly ozone levels recorded at the Arkansas Street monitoring station during the period 1993-2002, as well as the number of days in which the state and federal standards were exceeded.

The long-term trends of maximum 1-hour ozone readings and violations of the state and federal standard are shown in Figure 8.1-6 for the Arkansas Street monitoring station. The data show that, on average, the state and federal ozone air quality standard have not been exceeded in the area in the past 10 years. Trends of maximum and 3-year average of the 4th highest daily concentrations of 8-hour average ozone readings and exceedances of the federal standard are shown in Figure 8.1-7. These levels are well below the federal 8-hour average standard. USEPA has proposed to redesignate the BAAQMD to an attainment area for the 1-hour federal standard; CARB has requested an initial designation of attainment for the BAAQMD for the 8-hour federal standard.

TABLE 8.1-2
Ozone Levels in San Francisco, Arkansas Street Monitoring Station, 1993-2002 (ppm)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest 1-hour Average	0.080	0.055	0.009	0.071	0.068	0.053	0.079	0.058	0.082	0.054
Highest 8-hour Average	0.052	0.045	0.067	0.050	0.059	0.046	0.057	0.043	0.054	0.049
Number of Days Exceeding:										
State Standard (0.09 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.12 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.08 ppm, 8-hour)	0	0	0	0	0	0	0	0	0	0

Source: ARB, 2004; USEPA, 2004.

8.1.3.2 Nitrogen Dioxide

Atmospheric NO_2 is formed primarily from reactions between nitric oxide (NO) and oxygen or ozone. NO is formed during high temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes, under certain conditions. For purposes of state and federal air quality planning, the BAAQMD is in attainment for NO_2.

Table 8.1-3 shows the long-term trend of maximum 1-hour NO_2 levels recorded at Arkansas Street, as well as the annual average level for each of those years. During this period there has not been a single violation of either the state 1-hour standard or the NAAQS of 0.053 ppm.

TABLE 8.1-3
Nitrogen Dioxide Levels in San Francisco, Arkansas Street Monitoring Station, 1993-2002 (ppm)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest 1-hour Average	0.080	0.091	0.088	0.081	0.067	0.080	0.103	0.074	0.073	0.075
Annual Average (NAAQS = 0.053 ppm)	0.024	0.022	0.021	0.021	0.020	0.020	0.021	0.020	0.019	0.019
Number of Days Exceeding:										
State Standard (0.25 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.053 ppm, annual arithmetic mean)	0	0	0	0	0	0	0	0	0	0

Source: ARB, 2004; USEPA, 2004.

Figure 8.1-8 shows the historical trend of maximum 1-hour NO_2 levels at Arkansas Street. The NO_2 levels are approximately one-third of the state standard.

8.1.3.3 Carbon Monoxide

CO is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors to ambient CO levels. Industrial sources typically contribute less than 10 percent of ambient CO levels. Peak CO levels occur typically during winter months, due to a combination of higher emission rates and calm weather conditions with strong, ground-based inversions. Based upon ambient air quality monitoring, the Bay Area Air Basin is classified as being in attainment for CO.

Table 8.1-4 shows the California and federal air quality standards for CO, and the maximum 1- and 8-hour average levels recorded at the Arkansas Street monitoring station during the period 1993-2002.

TABLE 8.1-4
Carbon Monoxide Levels in San Francisco, Arkansas Street Monitoring Station, 1993-2002 (ppm)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest 1-hour average	7.0	5.8	5.3	5.4	4.8	7.1	5.4	5.5	4.0	3.5
Highest 8-hour average	5.13	4.40	4.44	3.8	3.45	3.96	3.68	3.19	3.28	2.57
Number of days exceeding:										
State Standard (20 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
State Standard (9.0 ppm, 8-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (9.3 ppm, 8-hr)	0	0	0	0	0	0	0	0	0	0

Source: ARB, 2004; USEPA, 2004.

Trends of maximum 1- and 8-hour average CO concentrations are shown in Figures 8.1-9 and 8.1-10, which show that maximum ambient CO levels at Arkansas Street have been well below the state standards for many years.

8.1.3.4 Sulfur Dioxide

SO_2 is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains negligible sulfur, while fuel oils contain larger amounts. Peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. The Bay Area Air Basin is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Table 8.1-5 presents the state air quality standard for SO_2 and the maximum levels recorded from 1993 through 2002 in San Francisco. The federal 24-hour average standard is 0.14 ppm; during the period shown, the average SO_2 levels measured at the Arkansas Street station have been approximately less than one-tenth of the federal standard. Figure 8.1-11 shows that for several years the maximum 24-hour SO_2 levels typically have been less than approximately one-third of the state standard.

TABLE 8.1-5
Sulfur Dioxide Levels in San Francisco, Arkansas Street Monitoring Station, 1993-2002 (ppm)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest 1-hour Average	0.040	0.017	0.044	0.036	0.026	0.036	0.028	0.019	0.025	0.053
Highest 24-hour Average	0.011	0.006	0.007	0.008	0.007	0.005	0.007	0.008	0.008	0.007
Annual Average	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
Number of Days Exceeding:										
State Standard (0.04 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.14 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0

Source: ARB, 2004; USEPA, 2004.

8.1.3.5 Particulate Sulfates

Particulate sulfates are the product of further oxidation of SO_2. The BAAQMD is in attainment of the state standard for sulfates. There is no federal standard for sulfates.

Table 8.1-6 shows the California air quality standard for particulate sulfate and the maximum 24-hour average levels recorded at Arkansas Street from 1993 through 2002. The trend of maximum 24-hour average sulfates over this period is plotted in Figure 8.1-12. Monitored concentrations have been well below half the state standard during this period.

TABLE 8.1-6
PM_{10} Sulfate Levels in San Francisco, Arkansas Street Monitoring Station, 1993-2002 ($\mu g/m^3$)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest 24-hour Average	5.0	12.3	6.0	7.5	5.6	3.3	9.7	4.2	15.7	4.8
Number of Days Exceeding:										
State Standard ($25\ \mu g/m^3$, 24-hr)	0	0	0	0	0	0	0	0	0	0

Source: ARB, 2004; USEPA, 2004.

8.1.3.6 Particulate Matter (PM_{10})

Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources and manufacturing processes; and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides. In 1984, CARB adopted standards for PM_{10} and phased out the total suspended particulate (TSP) standards that had been in effect previously. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of particulates that can be inhaled into the lungs and therefore is a better measure to use in assessing potential health effects. In 1987, USEPA also replaced national TSP standards with PM_{10} standards. The San Francisco Bay Area Air Basin is in attainment of the federal PM_{10} standards but exceeds the state standards.

Table 8.1-7 shows the federal and state air quality standards for PM_{10}, maximum levels recorded at the Arkansas Street monitoring station during 1993-2002, and geometric and arithmetic annual averages for the same period. The maximum 24-hour PM_{10} levels exceed the state standard, and the federal standard has not been exceeded during the past 10 years. The annual average PM_{10} levels have remained below the federal standards throughout the 10-year period.

The trend of maximum 24-hour average PM_{10} levels is plotted in Figure 8.1-13, and the trend of expected violations of the state 24-hour standard of 50 $\mu g/m^3$ is plotted in Figure 8.1-14. Note that since PM_{10} is measured only once every 6 days, expected violation days are 6 times the number of measured violations. The trend of maximum annual average PM_{10} readings and the California and federal standards are shown in Figure 8.1-15. Annual average PM_{10} concentrations are well below the federal standard, but remain slightly above the new state standard of 20 $\mu g/m^3$.

TABLE 8.1-7
PM_{10} Levels in San Francisco, Arkansas Street Monitoring Station, 1993-2002 (ppm)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest 24-hour Average	81	93	50	71	81	52	78	63	67	74
Annual Arithmetic Mean (State Standard = 20 $\mu g/m^3$)*	25.1	24.7	22.1	21.4	22.4	20.2	22.6	21.6	22.8	21.0
(Federal Standard = 50 $\mu g/m^3$)	28.8	28.6	24.8	24.3	24.9	22.1	26.4	24.3	26.3	24.7
Number of Days Exceeding:										
State Standard (50 $\mu g/m^3$, 24-hour)	29	34	0	12	14	6	36	12	42	12
Federal Standard (150 $\mu g/m^3$, 24-hour)	0	0	0	0	0	0	0	0	0	0

Source: ARB, 2004; USEPA, 2004.

* State annual standard was recently changed from 30 $\mu g/m^3$ to 20 $\mu g/m^3$.

8.1.3.7 Fine Particulate Matter ($PM_{2.5}$)

As discussed previously, the NAAQS for particulates were further revised by USEPA with new standards that went into effect on September 16, 1997; two new $PM_{2.5}$ standards were added at that time. In June 2002, CARB established a new annual standard for $PM_{2.5}$. $PM_{2.5}$ data have been collected at the Arkansas Street monitoring station since 1999, and are presented below.

Table 8.1-8 shows the State and federal air quality standards for $PM_{2.5}$, maximum levels recorded at the Arkansas Street monitoring station 1999-2002, and 3-year averages for the same period. The 24-hour average concentrations have exceeded the standard occasionally throughout the monitoring period; however, there are not enough data available to draw any conclusions regarding trends in the 3-year average of 98th percentile values. Annual average $PM_{2.5}$ levels have also occasionally exceeded the standard. The Bay Area Air Basin is considered a nonattainment area for the state $PM_{2.5}$ standard but is unclassified in relation to the federal standard.

The trend of maximum 24-hour average $PM_{2.5}$ levels is plotted in Figure 8.1-16.

TABLE 8.1-8
$PM_{2.5}$ Levels in San Francisco, Arkansas Street Monitoring Station, 1993-2002 (ppm)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest 24-hour Average	–	–	–	–	–	–	71.2	47.9	76.6	70.2
Number of Days Exceeding:										
Federal Standard (65 μg/m^3, 24-hour)	–	–	–	–	–	–	1	0	2	4
98th Percentile	–	–	–	–	–	–	47.4	35.3	51.3	57.5
3-yr Average, 98th Percentile	–	–	–	–	–	–	–	–	–	–
Annual Arithmetic Mean	–	–	–	–	–	–	12.6	11.4	11.5	13.1
3-yr Annual Average (Federal Std = 15 μg/m^3)	–	–	–	–	–	–	–	11.8	12.0	–

Source: ARB, 2004; USEPA, 2004.

8.1.3.7 Airborne Lead

The majority of lead in the air results from the combustion of fuels that contain lead. Twenty-five years ago, motor gasolines contained relatively large amounts of lead compounds used as octane-rating improvers, and ambient lead levels were relatively high. Beginning with the 1975 model year, new automobiles began to be equipped with exhaust catalysts, which were poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing fraction of new vehicles, and the phaseout of leaded gasoline began. As a result, ambient lead levels decreased dramatically. The Bay Area Air Basin has been in attainment of state and federal airborne lead levels for air quality planning purposes for a number of years.

The ambient lead levels are also monitored at Arkansas Street. Table 8.1-9 lists the federal air quality standard for airborne lead and the levels reported in San Francisco between 1993 and 2002. Maximum quarterly levels are well below the federal standard (ARB no longer reports summary lead statistics on its website).

TABLE 8.1-9
Airborne Lead Levels at San Francisco, Arkansas Street Monitoring Station, 1993-2002 (ppm)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest Quarterly Average	0.03	0.02	0.03	0.01	0.02	0.01	0.01	0.02	0.01	0.01
Number of Days Exceeding:										
Federal Standard (1.5 μg/m^3, quarterly)	0	0	0	0	0	0	0	0	0	0

Source: USEPA, 2004.

8.1.4 Affected Environment

The USEPA has responsibility for enforcing, on a national basis, the requirements of many of the country's environmental and hazardous waste laws. California is under the

jurisdiction of USEPA Region IX, which has its offices in San Francisco. Region IX is responsible for the local administration of USEPA programs for California, Arizona, Nevada, Hawaii, and certain Pacific trust territories. USEPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the State Implementation Plan (SIP). The SIP is required by the federal Clean Air Act to demonstrate how all areas of the state will meet the national ambient air quality standards within the federally specified deadlines (42 USC §7409, 7411).

The California Air Resources Board was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update as necessary the state's ambient air quality standards; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the SIP for achievement of the federal ambient air quality standards (California Health & Safety Code (H&SC) §39500 et seq.).

When the state's air pollution statutes were reorganized in the mid-1960s, local air pollution control districts (APCDs) were required to be established in each county of the State (H&SC §4000 et seq.). There are three different types of districts: county, regional, and unified. In addition, special air quality management districts (AQMDs), with more comprehensive authority over non-vehicular sources as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California, including the San Francisco Bay Area (H&SC §40200 et seq.).

Air pollution control districts and air quality management districts in California have principal responsibility for:

- Developing plans for meeting the state and federal ambient air quality standard;
- Developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards;
- Implementing permit programs established for the construction, modification, and operation of sources of air pollution; and
- Enforcing air pollution statutes and regulations governing non-vehicular sources; and
- developing employer-based trip reduction programs.

Each level of government has adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to this project. The other air agencies having permitting authority for this project are shown in Table 8.1-10. The applicable federal laws, ordinances, regulations and standards (LORS) and compliance with these requirements are discussed in more detail in the following sections. An application for a Determination of Compliance will be filed with the BAAQMD at approximately the same time as the Application for Certification (AFC) is filed with the Commission.

TABLE 8.1-10
Air Quality Agencies

Agency	Authority	Contact
USEPA Region IX	Oversight of permit issuance, enforcement	Gerardo Rios, Chief Permits Office USEPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 744-1259
California Air Resources Board	Regulatory oversight	Mike Tollstrup, Chief Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
Bay Area Air Quality Management District	Permit issuance, enforcement	Brian Bateman, Director Engineering Division Bay Area Air Quality Management District 939 Ellis Street San Francisco, CA 94109 (415) 749-4653

8.1.4.1 Laws, Ordinances, Regulations, and Standards

8.1.4.1.1 Federal

Prevention of Significant Deterioration Program

Authority: Clean Air Act §160-169A, 42 USC §7470-7491; 40 CFR Parts 51 and 52

Requirements: Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies with respect to attainment pollutants for which ambient concentrations are lower than the corresponding national ambient air quality standards (NAAQS). The following federal requirements apply on a pollutant-by-pollutant basis, depending on facility emission rates.

- Emissions must be controlled using Best Available Control Technology (BACT).
- Air quality impacts in combination with other increment-consuming sources must not exceed maximum allowable incremental increases for SO2, PM10, and NO_x.
- Air quality impacts of all sources in the area plus ambient pollutant background levels cannot exceed NAAQS.
- Pre- and/or post-construction air quality monitoring may be required.
- The air quality impacts on soils, vegetation, and nearby PSD Class I areas (specific national parks and wilderness areas) must be evaluated. (Note: The SFERP is located in a Class II area.)

PSD review jurisdiction had been delegated to the Bay Area Air Quality Management District (BAAQMD) for all pollutants; however, the delegation was rescinded in March 2003 and PSD permits for BAAQMD major sources are now issued by USEPA Region IX. Since

the proposed project is not subject to PSD review, the applicant will not need to seek a separate permit from USEPA.

Administering Agency: USEPA Region IX.

New Source Review
Authority: Clean Air Act §171-193, 42 USC §7501 et seq.; 40 CFR Parts 51 and 52

Requirement: Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. New source review applies with respect to nonattainment pollutants for which ambient concentration levels are higher than the corresponding NAAQS. The following federal requirements apply on a pollutant-by-pollutant basis, depending on facility emission rates.

- Emissions must be controlled to the lowest achievable emission rate (LAER).
- Sufficient offsetting emissions reductions must be obtained following the requirements in the regulations to continue reasonable further progress toward attainment of applicable NAAQS.
- The owner or operator of the new facility must demonstrate that major stationary sources owned or operated by the same entity in California are in compliance or on schedule for compliance with applicable emissions limitations in the rule.
- The administrator must find that the implementation plan has been adequately implemented.
- An analysis of alternatives must show that the benefits of the proposed source significantly outweigh any environmental and social costs.

New source review jurisdiction has been delegated to the BAAQMD for all pollutants and is discussed further under local LORS and conformance below.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

Acid Rain Program
Authority: Clean Air Act §401 (Title IV), 42 USC §7651

Requirement: Requires the reduction of the adverse effects of acid deposition through reductions in emissions of sulfur dioxide and nitrogen oxides. BAAQMD has received delegation authority to implement Title IV.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

Title V Operating Permits Program
Authority: Clean Air Act §501 (Title V), 42 USC §7661

Requirements: Establishes comprehensive operating permit program for major stationary sources. BAAQMD has received delegation authority for this program.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

National Standards of Performance for New Stationary Sources
Authority: Clean Air Act §111, 42 USC §7411; 40 CFR Part 60

Requirements: Establishes national standards of performance for new stationary sources. These standards are enforced at the local level with USEPA oversight. Relevant new stationary source performance standards are discussed under local LORS below.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

National Emission Standards for Hazardous Air Pollutants
Authority: Clean Air Act §112, 42 USC §7412

Requirements: Establishes national emission standards for hazardous air pollutants. These standards are enforced at the local level with USEPA oversight and are further discussed under local LORS and conformance below.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

8.1.4.1.2 State

Nuisance Regulation
Authority: CA Health & Safety Code §41700

Requirements: Provides that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Administering Agency: BAAQMD and CARB

Toxic "Hot Spots" Act
Authority: H& SC §44300-44384; 17 CCR §93300-93347

Requirements: Requires preparation and biennial updating of inventory of facility emissions of hazardous substances listed by CARB, in accordance with CARB's regulatory guidelines. Risk assessments are to be prepared by facilities required to submit emissions inventories according to local priorities.

Administering Agency: BAAQMD and CARB

CEC and CARB Memorandum of Understanding
Authority: CA Pub. Res. Code §25523(a); 20 CCR §1752, 1752.5, 2300-2309 and Div. 2, Chap. 5, Art. 1, Appendix B, Part (k)

Requirements: Provides for the inclusion of requirements in the CEC's decision on an application for certification to assure protection of environmental quality; application is required to include information concerning air quality protection.

Administering Agency: California Energy Commission

8.1.4.1.3 Local

District Regulations and Policies

Authority: CA Health & Safety Code §40001

Requirements: Prohibit emissions and other discharges (such as smoke and odors) from specific sources of air pollution in excess of specified levels.

Administering Agency: BAAQMD, with CARB oversight.

Environment Code/Department of Public Health

Authority: Environment Code Chapter 10, Department of Public Works, Order No. 171,378

Requirements: Require implementation of dust reduction measures set forth in the Environmental Code and Order 171,378 during construction of the project.

Administering Agency: City Agencies awarding contracts and the San Francisco Department of Public Works.

San Francisco Board of Supervisors Ordinances and Resolutions

Authority: Board of Supervisors Ordinance 124-01

Requirements: Adopts minimum requirements for protection of human health and the environment for new electric generation at the Potrero Power Plant.

Administering Agency: San Francisco Board of Supervisors

8.1.4.2 Conformance of Facility

As addressed in this section, SFERP is designed, and will be constructed and operated, in accordance with all relevant federal, State, and local requirements and policies concerning protection of air quality.

8.1.4.2.1 Federal and Bay Area Air Quality Management District Prevention of Significant Deterioration Program

USEPA has promulgated PSD regulations for areas that are in compliance with national ambient air quality standards (40 CFR 52.21). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., specific national parks and wilderness areas). Although USEPA had delegated the authority to implement the PSD program to various California air pollution control districts, including the BAAQMD where SFERP is located (40 CFR 52.21[u]), that delegation was rescinded on March 3, 2003, and PSD permits for the Bay Area are now issued by USEPA Region IX. However, the BAAQMD regulations still require compliance with the District's own PSD program.

The five principal areas of the federal PSD program are as follows:

- Applicability
- Best available control technology
- Pre-construction monitoring
- Increments analysis
- Air quality impact analysis

The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing stationary source. (These terms are defined in federal regulations.) (40 CFR 52.21) The determination of applicability is based on evaluating the emissions changes associated with the proposed project in addition to all other emissions changes at the same location since the applicable PSD baseline dates (40 CFR 52.21).

Under the BAAQMD PSD program (Regulation 2, Rule 2), best available control technology (BACT) must be applied when a new or modified major source shows emission increases in excess of 10 pounds per highest day of precursor organic compounds (POC), nonprecursor organic compounds (NPOC), NO_x, SO_2, PM_{10}, or CO. The BAAQMD program also dictates that a permit for a project will be denied if specified emissions thresholds are exceeded unless air dispersion modeling shows that ambient air quality standards will not be violated and the applicable PSD increments, as defined in the PSD rule, will not be exceeded. The PSD emission threshold levels for requiring modeling are shown in Table 8.1-11.

TABLE 8.1-11
BAAQMD Emission Threshold Levels for Modeling

Pollutant	Major Source Threshold
PM_{10}	100 tpy
NO_x	100 tpy
SO_2	100 tpy
VOC	100 tpy
CO	100 tpy

tpy tons per year

The PSD program applies, on a pollutant-specific basis, only to a new major stationary source or to a major modification of an existing major stationary source that meets the following criteria:

- A new facility that will emit 100 tons per year (tpy) or more, and is one of the 28 PSD source categories in the federal Clean Air Act or any new facility that will emit 250 tpy or more; or
- A facility that emits 100 tpy or more with net emissions increases since the applicable PSD baseline date that exceed the significant emissions threshold levels.

Since the emissions from the SFERP will be less than 100 tpy, the PSD program requirements do not apply.

8.1.4.2.2 Federal New Source Performance Standards

The Standards of Performance for New Stationary Sources are source-specific federal regulations, limiting the allowable emissions of criteria pollutants (i.e., those that have a national ambient air quality standard). These regulations apply to certain sources depending on the equipment size, process rate, and/or the date of construction, modification, or reconstruction of the affected facility. Recordkeeping, reporting, and

monitoring requirements are usually necessary for the regulated pollutants from each subject source; the reports must be regularly submitted to the reviewing agency (40 CFR 60.4). This program has been delegated by USEPA to the BAAQMD.

Subpart GG (Standards of Performance for Stationary Gas Turbines) applies to combustion turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (Gj/hr) (10.15 MMBtu/hr) at higher heating value. The SFERP combustion turbines have an hourly heat input that exceeds this threshold. The NSPS NO_x emission limit is defined by the following equation:

$$STD = \frac{0.0075 * 14.4}{Y} + F$$

where:

STD = allowable NO_x emissions (percent volume at 15 percent O2 on a dry basis)

Y = manufacturer's rated heat rate at peak load (kilojoules per watt hour)

F = NO_x emission allowance for fuel-bound nitrogen (assumed to be zero for natural gas)

The value of Y for the LM6000 SPRINT CTGs is 8916 kJ/kWh LHV, or 9888 kJ/kWh HHV. This corresponds to a NSPS limit of 109 ppm.

8.1.4.2.3 National Emissions Standards for Hazardous Air Pollutants

The National Emissions Standards for Hazardous Air Pollutants (NESHAPs) are either source-specific or pollutant-specific regulations, limiting the allowable emissions of hazardous air pollutants from the affected sources (40 CFR 61). Unlike criteria air pollutants, hazardous air pollutants do not have a national ambient air quality standard but have been identified by USEPA as causing or contributing to the adverse health effects of air pollution.

Administration of the hazardous air pollutants program has been delegated to the BAAQMD and is described in Subsection 8.1.4.2.10 (40 CFR 61.04).

8.1.4.2.4 Federal Clean Air Act Amendments of 1990

In November 1990, substantial revisions and updates to the federal Clean Air Act were signed into law. This complex enactment addresses a number of areas that could be relevant to the proposed SFERP, such as State Implementation Plan requirements for nonattainment areas that set new compliance deadlines and annual progress increments, more extensive permitting requirements, new USEPA mandates and deadlines for developing rules to control air toxic emissions, and acid deposition control. Following is a summary of the new provisions applicable to this project.

Title IV—Acid Deposition Control

This title requires the reduction of emissions of acidic compounds and their precursors (42 USC §7651 et seq.). The principal source of these compounds is the combustion of fossil fuels. Other requirements include monitoring and recordkeeping for emissions of SO_2 and NO_x and for opacity and volumetric flow.

Title V—Operating Permits

This title establishes a comprehensive operating permit program for major stationary sources (42 USC §7661 et seq.). Under the Title V program, a single permit is required that includes a listing of all the stationary sources, applicable regulations, requirements, and compliance determination.

The BAAQMD's Major Facility Review Program (Regulation 2, Rule 6) has been approved by USEPA and includes the acid rain program. Consequently, the BAAQMD has received delegation to implement the Title IV and V programs. The BAAQMD Title IV and V permit programs applicable to this project are summarized below.

8.1.4.2.5 California Clean Air Act

AB 2595, the California Clean Air Act (Act), was enacted by the California Legislature and became law in January 1989. The Act requires the local air pollution control districts to attain and maintain both the federal and state ambient air quality standards at the "earliest practicable date." The Act contains several milestones for local districts and the California Air Resources Board. In 1993, the BAAQMD submitted to the Air Resources Board an air quality plan defining the program for meeting the required emission reduction milestones in the Bay Area. Several updates to the original plan have also been submitted.

Air quality plans must demonstrate attainment of the state ambient air quality standards and must result in a five percent annual reduction in emissions of nonattainment pollutants (ozone, CO, NO_x, SO_2, and their precursors) in a given district (H&SC §40914). A local district may adopt additional stationary source control measures or transportation control measures, revise existing source-specific or new source review rules, or expand its vehicle inspection and maintenance program (H&SC §40918) as part of the plan. District air quality plans specify the development and adoption of more stringent regulations to achieve the requirements of the Act. The applicable regulations that will apply to SFERP are included in the discussion of BAAQMD prohibitory rules in Subsection 8.1.4.2.8.

8.1.4.2.6 BAAQMD New Source Review Requirements

BAAQMD Regulation 2, Rule 2, New Source Review, requires that a pre-construction review be conducted for all proposed new or modified sources of air pollution. New Source Review contains three principal elements:

- Best available control technology (BACT)
- Emissions offsets
- Air quality impact analysis

BACT is required for any source that has an increase in emissions of any criteria pollutant and that has a potential to emit in excess of 10 pounds per highest day. The district rule also contains separate BACT thresholds for nine "non-criteria" pollutants, such as lead and various sulfur compounds.

The BAAQMD regulation further requires that for new or modified sources emitting in excess of 50 tons per year of POCs or NO_x, the total project emissions must be offset (i.e., an emission reduction comparable to the emission increase attributable to the source must be achieved at the project site or at another location). To ensure that there is no net increase in regional emissions as a result of new or modified sources, offsets at a ratio of 1.15 to 1.0 must be provided. For facilities emitting more than 15 but less than 50 tons per year of

POCs or NO_x, offsets are provided by the District from the Small Facility Banking account at a ratio of 1.0 to 1.0 unless ERCs are owned by the developer.

In addition, a Major Facility (100 tpy facility) is required to offset net emissions increases from a project, on a pollutant-specific basis, in excess of 1 tpy of PM_{10} and SO_2 that have occurred or will occur after April 5, 1991.

For the BAAQMD, an air quality impact analysis is required to demonstrate that the project must not cause a violation or interfere with the maintenance of any ambient air quality standards or applicable increments.

Finally, the district may impose appropriate monitoring requirements to ensure compliance. District Regulation 2, Rule 3 specifies procedures for review and standards for approval of Authorities to Construct power plants within the District. The applicant must obtain a Determination of Compliance and an Authority to Construct from the District prior to commencing construction. An application for a Determination of Compliance and an Authority to Construct is expected to be filed with the BAAQMD within one week of the filing of the AFC with the CEC.

8.1.4.2.7 Risk Management Policy

The District has developed a procedure for reviewing permit applications for projects that will emit compounds that may result in health impacts. The procedure requires comparing the potential emissions of toxic air contaminants from the project to specific levels, and requires the preparation of a written risk screening analysis if the levels are exceeded. The screening analysis includes estimates of the maximum annual concentrations of the toxic air contaminants, calculations of cancer risk, and comparison of maximum modeled concentrations with appropriate non-cancer threshold levels. The use of best available control technology for toxic air contaminant emissions is required if the incremental cancer risk from the project is projected to be between 1 and 10 in 1 million.

8.1.4.2.8 Other BAAQMD Regulatory Requirements

As required by the federal Clean Air Act and the California Clean Air Act, plans that demonstrate attainment must be developed for those areas that have not attained the national and state air quality standards (42 USC §7401; H&SC §40912). As part of its plan, the BAAQMD has developed regulations limiting emissions from specific sources. These regulations are collectively known as "prohibitory rules," because they prohibit the construction or operation of a source of pollution that would violate specific emission limits.

The general prohibitory rules of the BAAQMD applicable to the SFERP are as follows.

Regulation 1-301—Public Nuisance

Prohibits emissions in quantities that adversely affect public health, other businesses, or property.

Regulation 6—Particulate Matter and Visible Emissions

Limits the visible emissions from the project to no darker than No. 1 when compared to a Ringelmann Chart for a period or periods aggregating more than 3 minutes in any hour. Opacity is limited to no greater than 20 percent from any source for a period or periods aggregating 3 minutes in any hour. Particulate emission concentrations cannot exceed 0.15 grains per dry standard cubic foot of exhaust gas volume.

Regulation 7—Odorous Substances
Limits emission concentrations of dimethylsulfide, ammonia, mercaptan, phenols, and trimethylamine. This regulation becomes applicable upon confirmation of 10 or more odor complaints from the public within a 90-day period. Once the rule becomes applicable, it remains in effect for one year and can be re-triggered with the receipt of 5 or more odor complaints within a 90-day period.

Regulation 9, Rule 1—Sulfur Dioxide
Limits stationary source emissions of sulfur dioxide to less than 300 ppm. In addition, the rule restricts sulfur dioxide emissions that will result in ground-level concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours.

Regulation 9, Rule 2—Hydrogen Sulfide
Limits the emission of hydrogen sulfide during any 24-hour period in such quantities that result in ground-level hydrogen sulfide concentrations in excess of 0.06 ppm averaged over 3 consecutive minutes or 0.03 ppm averaged over any 60 consecutive minutes.

Regulation 9, Rule 3—Nitrogen Oxides From Heat Transfer Operations
Limits emissions of nitrogen oxides from new or modified heat transfer operations to less than 125 ppm.

Regulation 9, Rule 9—Nitrogen Oxides from Stationary Gas Turbines
Limits emissions of nitrogen oxides from combustion turbines during baseload operations to less than 9 ppmv corrected to 15 percent oxygen.

Regulation 11, Rule 10—Hexavalent Chromium Emissions From Cooling Towers
Limits hexavalent chromium emissions from cooling towers by eliminating the use of chromium-based chemicals.

8.1.4.2.9 BAAQMD New Source Performance Standards
Regulation 10 (40 CFR 60 Subpart GG)—Standards of Performance for Stationary Gas Turbines. The BAAQMD has adopted by reference the federal New Source Performance Standard (NSPS) for stationary gas turbines. This regulation requires monitoring of sulfur and nitrogen in the fuel; limits emissions of NO_x and SO_2 emissions; requires source testing of emissions; requires emissions monitoring; and requires recordkeeping for the collected data.

8.1.4.2.10 BAAQMD Hazardous Air Pollutants
USEPA recently established a NESHAP standard for formaldehyde from stationary gas turbines. This regulation applies to new and reconstructed gas turbines. Because the HAP emissions for the project are below the major source thresholds of 10 tpy for a single HAP and 25 tpy for any combination of HAPs, the project is exempt from the NESHAP for combustion turbines. Consequently, this regulation does not apply to the project and will not be addressed further. Please note that while Subsection 8.1.5.2.4 shows ammonia emissions greater than 25 tpy for the project, ammonia is not a HAP as defined by Section 112 of the Clean Air Act.

8.1.4.2.11 BAAQMD Title IV and Title V Programs

BAAQMD Regulation 2, Rule 6—Major Facility Review

This rule implements the operating permit requirements of Title V of the federal Clean Air Act. The rule applies to major facilities, Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility listed by USEPA as requiring a Title V permit. As a Phase II acid rain facility, the SFERP will be required to submit a permit application to undergo a major facility review within 12 months of commencement of facility operation.

The BAAQMD has adopted by reference the federal Title IV (Acid Rain) Regulation and is now responsible for implementing the program through the Title V operating permit program. Under Title IV, a project must comply with maximum operating emissions levels for SO_2 and NO_x and is required to install and operate continuous monitoring systems for SO_2, NO_x, and CO_2 emissions. Extensive recordkeeping and reporting requirements are also part of the acid rain program.

8.1.4.2.12 San Francisco Board of Supervisors Ordinance No. 124-01 and Resolutions No. 827-02 and 458-03

In May 2001 the San Francisco Board of Supervisors adopted Ordinance No. 124-01, which sets forth minimum requirements for the protection of human health and the environment for any proposed new electric generation at the Potrero Power Plant. The Ordinance calls for the Board to work with the San Francisco Public Utilities Commission (SFPUC) and the Department of the Environment (ENV) to adopt a new electricity resource plan for San Francisco. The Board has also adopted Resolution No. 827-02, which adopted the Electricity Resource Plan prepared by SFPUC and ENV as policy guidelines.

All applicable LORS are summarized in Table 8.1-12.

8.1.5 Environmental Impacts

8.1.5.1 Overview of the Analytical Approach to Estimating Facility Impacts

The new emissions sources at the SFERP include three simple-cycle LM6000 Sprint combustion turbines and a small two-cell cooling tower. The cooling tower will be used to provide plant auxiliary cooling water and to chill turbine inlet air, which increases power output under certain ambient conditions. Each turbine will be equipped with water injection and a selective catalytic reduction (SCR) system for NO_x control, and an oxidation catalyst for control of CO. Emissions control systems will be fully operational during all operations except startups and shutdowns. Maximum annual emissions are based on operation of the SFERP equipment at maximum firing rates for up to 12,000 engine hours per year, total for the three CTGs (Annual facility operation will be limited to the equivalent of 12,000 full-load hours per year through an annual heat input limit).

Ambient air quality impact analyses for the facility have been conducted to satisfy the CEC requirements for impacts from criteria pollutants (NO_2, CO, PM_{10}, and SO_2) and noncriteria pollutants during project construction and operation. The following sections describe the emission sources that have been evaluated, the results of the ambient impact analyses, and the evaluation of facility compliance with the applicable air quality regulations, including BAAQMD Regulation 2 (Permits). Regulation 2, Rule 2 includes the District's NSR requirements.

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Federal					
Clean Air Act (CAA) §160-169A and implementing regulations, Title 42 United States Code (USC) §7470-7491 (42 USC 7470-7491), Title 40 Code of Federal Regulations (CFR) Parts 51 & 52 (40 CFR 51 & 52) (Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	BAAQMD with USEPA oversight	After project review, issues Authority to Construct (ATC) with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.1 (p. 47), 8.1.4.2.1 (p.13), Appendix 8.1E
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.1 (p. 47), 8.1.4.2.1 (p.13), Appendices 8.1-5, 8.1-6
CAA §401 (Title IV), 42 USC §7651 (Acid Rain Program)	Requires reductions in NO_x and SO_2 emissions.	BAAQMD with USEPA oversight	Issues Acid Rain permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.2.4 (p.15)
CAA §501 (Title V), 42 USC §7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	BAAQMD with USEPA oversight	Issues Title V permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.2.4 (p.15)
CAA §111, 42 USC §7411, 40 CFR Part 60 (New Source Performance Standards [NSPS])	Establishes national standards of performance for new stationary sources.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6 (p. 47), 8.1.4.2.2 (p. 14)
CAA §112, 42 USC §7412, 40 CFR Part 63 (National Emission Standards for Hazardous Air Pollutants [NESHAPs])	Establishes national emission standards for hazardous air pollutants.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6 (p. 47), 8.1.4.2.3 (p. 15)

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
State					
California Health & Safety Code (H&SC) §41700 (Nuisance Regulation)	Outlaws discharge of such quantities of air contaminants that cause injury, detriment, nuisance, or annoyance.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1.2 (p. 12)
H&SC §44300-44384; California Code of Regulations (CCR) §93300-93347 (Toxic "Hot Spots" Act)	Requires preparation and biennial updating of facility emission inventory of hazardous substances; risk assessments.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Screening HRA submitted before start of construction.	8.1.5.4 (p.43), 8.1.4.1.2 (p.12), Appendix 8.1C
California Public Resources Code §25523(a); 20 CCR §1752, 2300-2309 (CEC & CARB Memorandum of Understanding)	Requires that CEC's decision on AFC include requirements to assure protection of environmental quality; AFC required to address air quality protection.	CEC	After project review, issues Final Determination of Compliance (FDOC) with conditions limiting emissions.	CEC approval of AFC, i.e., FDOC, to be obtained before start of construction.	8.1.4.1.2 (p. 13)
Local					
BAAQMD Regulation 1 §301 (Public Nuisance)	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p.52), 8.1.4.2.8 (p.17)
BAAQMD Regulation 2 (Permits), Rule 2 (New Source Review)	NSR and PSD: Requires that preconstruction review be conducted for all proposed new or modified sources of air pollution, including BACT, emissions offsets, and air quality impact analysis.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.5.1, 8.1.5.2, 8.1.5.3, 8.1.5.4 (pp. 23-43), 8.1.6.3 (p.47), 8.1.4.2.6 (p. 16), Appendices 8.1-2, 8.1-5, 8.1-6
BAAQMD Regulation 2, Rule 6 (Major Facility Review)	Implements operating permits requirements of CAA Title V and acid rain regulations of CAA Title IV.	BAAQMD	Issues Title V permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.6.1 (p. 52), 8.1.4.2.4 (p. 15), 8.1.4.2.11 (p. 19)
BAAQMD Regulation 6 (Particulate Matter and Visible Emissions)	Limits visible emissions to no darker than Ringelmann No. 1 for periods greater than 3 minutes in any hour; limits PM emissions to #0.15 gr/dscf.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 52), 8.1.4.2.8 (p. 17)

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
BAAQMD Regulation 7 (Odorous Substances)	Limits emissions of dimethylsulfide, ammonia, mercaptan, phenols, and trimethylamine; becomes applicable upon confirmation of 10 or more odor complaints with 90 days.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 17)
BAAQMD Regulation 9, Rule 1 (Sulfur Dioxide)	Limits SO_2 emissions to <300 ppm; also limits SO_2 emissions resulting in ground level concentrations of specified level and duration.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 18)
BAAQMD Regulation 9, Rule 2 (Hydrogen Sulfide)	Limits H_2S emissions during any 24-hour period that result in ground level H_2S concentrations exceeding specified levels and durations.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 18)
BAAQMD Regulation 9, Rule 3 (Heat Transfer Operation NO_x Emissions Limits)	Limits NO_x emissions from new heat transfer operations $250 MMBtu/hr maximum to <125 ppm.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 18)
BAAQMD Regulation 9, Rule 9 (Nitrogen Oxides from Stationary Gas Turbines)	Limits NO_x emissions during baseload operations to 9 ppmv @ 15 percent exhaust oxygen (15 ppmv if SCR is not used).	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 18)
BAAQMD Regulation 10 (40 CFR 60 Subpart GG) (Standards of Performance for Stationary Gas Turbines)	Requires monitoring of fuel, other operating parameters; limits NO_x and SO_2 emissions, requires source testing, emissions monitoring, and recordkeeping.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 19)
BAAQMD Regulation 11, (Hazardous Pollutants)	Implements federal NESHAP regulations.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1.1 (p. 12), 8.1.4.2.3 (p. 19)
San Francisco Board of Supervisors Ordinance No. 124-01	Establishes requirements for the siting, expansion or development of new electric generation in Southeast San Francisco	SF Board of Supervisors	After project review, the SF Board of Supervisors will vote to approve or disapprove project	Board of Supervisors approval to be obtained before start of construction	

8.1.5.1.1 New Equipment

The proposed combustion turbines are General Electric LM6000PC Sprint combustion turbines driving nominal 48 MW turbine generators. The combustion turbines will be fueled exclusively with natural gas. The combustion turbines will be equipped with water injection to control NO_x emissions and inlet air chillers to maintain turbine output across the full range of ambient temperatures. Post-combustion air pollution controls will include SCR for NO_x control and oxidation catalysts for carbon monoxide (CO) control. Any or all of the combustion turbines may be operated up to 24 hours per day, 7 days per week, with total plantwide heat input not to exceed the equivalent of 12,000 full-load engine hours per year (Annual facility operation will be limited to the equivalent of 12,000 full-load hours per year through an annual heat input limit). Specifications for the new combustion turbines are summarized in Table 8.1-13. A typical fuel analysis is summarized in Table 8.1-14.

TABLE 8.1-13
New LM6000PC Combustion Turbine Design Specifications

Manufacturer:	General Electric
Model:	LM6000PC
Fuel:	Natural gas
Design Ambient Temperature*:	36 °F
Nominal Heat Input Rate:	487.3 MMBtu/hr @ HHV
Nominal Power Generation Rate:	48 MW
Nominal Exhaust Temperature:	826 °F
Exhaust Flow Rate:	620,308 acfm
Exhaust O_2 Concentration, dry volume:	14.5%
Exhaust CO_2 Concentration, dry volume:	3.7%
Exhaust Moisture Content, wet volume:	11.2%
Emission Controls:	Water Injection and SCR (2.5 ppmv NO_x @ 15% O_2) Oxidation Catalyst (4 ppmv CO @ 15% O_2)

* Low-temperature scenario.

TABLE 8.1-14
Nominal Fuel Properties—Natural Gas

Component Analysis		Chemical Analysis	
Component	**Average Concentration, Volume**	**Constituent**	**Percent by Weight**
CH_4	95.80%	C	72.85%
C_2H_6	1.94%	H	23.91%
C_3H_8	0.30%	N	1.75%
C_4H_{10}	0.09%	O	1.50%

TABLE 8.1-14
Nominal Fuel Properties—Natural Gas

Component Analysis		Chemical Analysis	
Component	**Average Concentration, Volume**	**Constituent**	**Percent by Weight**
C_5H_{12}	0.02%	S	<1 gr/100 scf
N_2	1.05%	Higher Heating Value	1017 Btu/scf 22,895 Btu/lb
CO_2	0.79%		
S	<0.00%		

Engineering specifications for the turbines are contained in Appendix 8.1A, Table 8.A-1.

The two-cell cooling tower will be constructed adjacent to the turbines. The cooling tower will serve the condenser circuit heat rejection of the mechanical chillers used to chill the air entering the turbines. Specifications for the cooling tower are shown in Table 8.1-15.

TABLE 8.1-15
Cooling Tower Specifications

Parameter	Value
Water Flow Rate, 10E6 lb/hr	1.96
Water Flow Rate, gal/min	3,912
Drift Rate, %	0.001
Exhaust Flow Rate, ft^3/min (per cell, 2 cells)	214,950

8.1.5.1.2 Facility Operations

New LM6000PC Simple Cycle Combustion Turbines

General Electric provided combustion turbine performance specifications for three temperature scenarios—high temperature (80°F), ISO temperature (59°F), and low temperature (36°F). The ISO-temperature scenario with inlet air chilling was used to characterize maximum emissions because it has the highest hourly heat input and emission rates. Maximum daily operations are based on full-load operation of three CTGs for 24 hours. Maximum annual emissions are based on full-load operation for the equivalent of 12,000 full-load engine hours per year. Heat input limits, as summarized in Table 8.1-16, were established to provide the basis for the calculation of project and facility emissions.

TABLE 8.1-16
LM6000PC Combustion Turbine Operations

	Heat Input, MMBtu (HHV)	
Interval	**Each CTG**	**Total, Three CTGs**
Hourly	487.3	1,462
Daily	11,700	35,100
Annual	4,268,750	5,847,600

New Cooling Tower

The cooling tower will operate when inlet air chilling is necessary to maintain turbine output. For this application, the cooling tower is assumed to operate 24 hours per day, 8,760 hours per year.

8.1.5.2 Emissions Assessment: Criteria Pollutants

Criteria pollutants emitted from the combustion turbines include NO_x, sulfur oxides (SOx), CO, POCs and fine particulate matter (PM_{10}) (All of the particulate matter emitted from the CTGs and the cooling tower is assumed to be less than 2.5 microns in diameter. All references to PM_{10} include $PM_{2.5}$ as well). The cooling tower will emit only small quantities of PM_{10}. This section of the application presents calculated emissions from the new equipment.

The combustion turbines and cooling tower also will emit trace levels of toxic air contaminants (TACs), including ammonia. This section also presents the maximum TAC emissions from the proposed combustion turbines. Tables containing the detailed TAC emission calculations are included in Appendix 8.1A.

8.1.5.2.1 Criteria Pollutant Emissions: Combustion Turbines

Proposed maximum emissions from the LM6000PC combustion turbines were estimated on an hourly, daily, and annual basis based on expected peaking operation and proposed annual operating limitations.

Emissions during Normal Operations

Emissions of NO_x, CO, and POC were calculated from emission limits (in ppmv @ 15-percent O_2) and the exhaust flow rates. The NO_x emission limit reflects the application of SCR. The POC emission limit reflects the use of good combustion practices. The CO emission limit reflects the expected performance of the oxidation catalyst. Maximum emissions were based on the exhaust rate (222,850 dscfm) associated with the heat input rates shown in Table 8.1-16.

SOx emissions were calculated from the heat input (in MMBtu) and a SOx emission factor (in lb/MMBtu). The SOx emission factor of 0.00092 lb/MMBtu was derived from the expected annual average fuel sulfur content of 0.33 grains per 100 standard cubic feet. Maximum SOx emissions were calculated using the heat input rates in Table 8.1-16.

Maximum hourly PM_{10} emissions were obtained from manufacturer's guarantees for LM6000PC combustion turbines in previous applications and based on results of recent source tests of similar turbines. $PM_{2.5}$ emissions were determined based on the assumption that all particulate matter emissions are less than 2.5 microns in size.

Maximum emission rates for the LM6000PC combustion turbines are summarized in Table 8.1-17. The BACT analysis upon which the emission factors are based is presented in Appendix 8.1E and summarized in Subsection 8.1.6.3.

TABLE 8.1-17
Maximum Emission Rates—Each CTG

Pollutant	ppmv @ 15% O_2	lb/MMBtu	lb/hr
NO_x	2.5[a]	0.009	4.41
SO_2[b]	0.15	0.00092	0.45
CO	4.0[a]	0.0088	4.30
POC	2.0[a]	0.0025	1.23
PM_{10}	n/a	n/a	3.0

[a] NO_x, CO and POC emission rates exclude startups and shutdowns (see Table 8.1-18).

[b] Based on annual average natural gas sulfur content of 0.33 gr/100 scf.

Emissions During Startup and Shutdown

Maximum emission rates expected to occur during a startup or shutdown are shown in Table 8.1-18. PM_{10} and SO_2 emissions are not included in this table because emissions of these pollutants will be lower during startup and shutdown than during baseload facility operation.

TABLE 8.1-18
CTG Startup and Shutdown Emission Rates

	NO_x	CO	POC
Startup and Shutdown, lb/hr	40	10	2

8.1.5.2.2 Criteria Pollutants: Cooling Tower

Maximum emissions from the cooling tower are calculated from the average water flow rate, maximum drift rate, and maximum TDS of the make-up water. This calculation is shown in Appendix 8.1A, Table 8.1A-2. Although the cooling tower will operate only under high-temperature ambient conditions, emissions are calculated on a 24-hour per day, 8,760-hour per year basis. The two-cell cooling tower will emit a maximum of 0.04 pounds per day and 0.2 tons per year of PM_{10}. As emissions from the tower is less than 10 pounds per day and 5 tons per year, the cooling tower is exempt from permitting and is not subject to BACT or offset requirements.

8.1.5.2.3 Criteria Pollutant Emissions Summary

Maximum facility emissions are shown in Table 8.1-19. The emission calculations are based on the CTG emission rates shown in Tables 8.1-17 and 8.1-18; the fuel use limitations in Table 8.1-16, and the following assumptions:

- Each CTG may operate up to 24 hours per day
- Each CTG may have up to two 2-hour startups per day, with a total of 4 hours of startup/shutdown activity for each CTG
- Under typical operating conditions, only one CTG would startup at a time; however, under certain conditions, all 3 CTGs could startup simultaneously

- Each CTG may have a total of 250 hours per year of startup/shutdown activity
- Total annual fuel use by all 3 CTGs will be limited to the equivalent of 12,000 hours per year for the facility

TABLE 8.1-19
Emissions from New Equipment

Emissions/Equipment	NO_x	SO_2	CO	POC	PM_{10}
Maximum Hourly Emissions					
CTGs	120.0	1.3	30.0	6.0	9.0
Cooling Towers	–	–	–	–	<0.1
Total, pounds per hour	**120.0**	**1.3**	**30.0**	**6.0**	**9.0**
Maximum Daily Emissions					
CTGs	744.6	32.3	378.0	97.8	216.0
Cooling Towers	–	–	–	–	0.9
Total, pounds per day	**744.6**	**32.3**	**378.0**	**97.8**	**216.9**
Maximum Annual Emissions, tpy					
CTGs	39.8	2.7	27.9	7.7	18.0
Cooling Towers	–	–	–	–	0.2
Total, tons per year	**39.8**	**2.7**	**27.9**	**7.7**	**18.2**

8.1.5.3 Emissions Assessment: Toxic Air Contaminants

8.1.5.3.1 Toxic Air Contaminant Emissions: Combustion Turbines

Maximum hourly and annual TAC emissions were estimated for the proposed LM6000PC combustion turbines. Maximum proposed TAC emissions were calculated from the heat input rate (in MMBtu/hr and MMBtu/yr), emission factors (in lb/mmcf), and the nominal higher heating value of 1017 Btu/scf. Hourly and annual emissions were based on the heat input rates shown in Table 8.1-16. The ammonia emission factor was derived from an ammonia slip limit of 10 ppmv @ 15-percent O_2. Other emission factors were obtained from AP-42 (Table 3.1-3, 4/00, and Table 3.4-1 of the Background Document for Section 3.1) and from the California Air Resources Board's CATEF database for combustion turbines. TAC emissions are summarized in Table 8.1-20.

TABLE 8.1-20
Maximum Proposed TAC Emissions: Combustion Turbines

Compound	Emission Factor (lb/mmcf)[a]	Maximum Proposed Emissions, 3 CTGs (lb/hr)	Maximum Proposed Emissions, 3 CTGs (lb/year)
Ammonia[b]	10 ppm	19.6	78,480
Propylene	0.771	1.1	4,433
Hazardous Air Pollutants			
Acetaldehyde	0.0408	0.06	235
Acrolein	0.00369	5.3×10^{-3}	21
Benzene	0.00333	4.8×10^{-3}	19

TABLE 8.1-20
Maximum Proposed TAC Emissions: Combustion Turbines

Compound	Emission Factor (lb/mmcf)[a]	Maximum Proposed Emissions, 3 CTGs	
		(lb/hr)	(lb/year)
1,3-Butadiene	0.000439	$6.3x10^{-4}$	2.5
Ethylbenzene	0.0326	0.05	187
Formaldehyde	0.367	0.53	2,110
Hexane	0.259	0.37	1,489
Naphthalene	0.00166	$2.4x10^{-3}$	9.5
PAHs[c]	0.00017	$2.6x10^{-4}$	1.0
Propylene Oxide	0.0296	0.04	170
Toluene	0.133	0.19	765
Xylene	0.0653	0.09	376
TOTAL HAPs		*1.4*	*5,385*

[a] Obtained from AP-42 and the CATEF database for natural gas-fired combustion turbines. See text.
[b] Based on an exhaust NH_3 limit of 10 ppmv @ 15% O_2.
[c] Carcinogenic PAHs only; naphthalene considered separately.

8.1.5.3.2 Toxic Air Contaminant Emissions: Cooling Tower

TAC emissions from the cooling tower were calculated from the maximum drift (see Appendix 8.1A, Table 8.1A-2) of approximately 20 pounds of water per hour and an analysis of cooling tower blowdown. These calculations are shown in Appendix 8.1A, Table 8.1A-5. This table includes a comparison of the maximum cooling tower TAC emission rates with the BAAQMD TAC trigger levels, and shows that TACs from the cooling tower will be well below the trigger levels. Therefore, except for chromium, the TAC emissions from the cooling tower are considered to be negligible and are not evaluated further.

8.1.5.3 Air Quality Impact Analysis

BAAQMD Rule 2-2-414 requires the applicant to provide ambient air quality modeling analyses and other impact assessments. This rule is applicable only if the proposed project is subject to PSD review, if it is a major facility with emissions of certain noncriteria pollutants in excess of the amounts listed in Rule 2-2-306, or if it is a facility with a net emissions increase greater than zero that proposes construction within 10 miles of a Class I area. Table 8.1-19 shows that emissions of all pollutants from the new facility will be less than 100 tons per year, so the facility is not a major source or subject to PSD.[1] Further, the proposed facility will not be located within 10 miles of a Class I area.[2] Therefore, the modeling requirements of Regulation 2, Rule 2 are not applicable to the proposed project. However, the CEC requires various ambient air quality impact analyses for CEQA review, and those analyses are presented in this section.

1 Simple cycle combustion turbines are not one of the 28 PSD source categories listed in Section 169(1) of the Clean Air Act, so the facility would not be subject to PSD unless its emissions equal or exceed 250 tpy.

2 The nearest Class I area, Point Reyes Wilderness Area, is over 20 miles from the project site.

8.1.5.3.1 Air Quality Modeling Methodology. An assessment of impacts from the SFERP combustion turbines on ambient air quality has been conducted using USEPA-approved air quality dispersion models. These models are based on various mathematical descriptions of atmospheric diffusion and dispersion processes in which a pollutant source impact can be calculated over a given area.

Figure 8.1B-1 in Appendix 8.1B shows the building layout used in the modeling analysis. The impact analysis was used to determine the worst-case ground-level impacts of the new turbines. The results were compared with established state and federal ambient air quality standards and PSD significance levels. If the standards are not exceeded then it is assumed that, in the operation of the facility, no exceedances are expected under any conditions. In accordance with the air quality impact analysis guidelines developed by USEPA (40 CFR Part 51, Appendix W: Guideline on Air Quality Models) and CARB (Reference Document for California Statewide Modeling Guideline, April 1989), the ground-level impact analysis includes the following assessments:

- Impacts in simple, intermediate, and complex terrain;
- Aerodynamic effects (downwash) due to nearby building(s) and structures;
- Impacts from inversion breakup (fumigation); and
- Impacts from shoreline fumigation conditions.

Simple, intermediate, and complex terrain impacts were assessed for all meteorological conditions that would limit the amount of final plume rise. Plume impaction on elevated terrain, such as on the slope of a nearby hill, can cause high ground-level concentrations, especially under stable atmospheric conditions. Another dispersion condition that can cause high ground-level pollutant concentrations is caused by building downwash. Building downwash can occur when wind speeds are high and a building or structure is in close proximity to the emission stack. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists in the lee side (downwind) of the building or structure.

Fumigation conditions occur when the plume is emitted into a low-lying layer of stable air (inversion) that then becomes unstable, resulting in a rapid mixing of pollutants towards the ground. The low mixing height that results from this condition allows little diffusion of the stack plume before it is carried downwind to the ground. Although fumigation conditions rarely last as long as an hour, relatively high ground-level concentrations may be reached during that period. Fumigation tends to occur under clear skies and light winds, and is more prevalent in the summer. Because land surfaces tend to both heat and cool more rapidly than water, shoreline fumigation tends to occur on sunny days when the denser cooler air over water displaces the warmer, lighter air over land. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between the stable air over the water and the unstable air over the land, and the wind speed determine if the plume will loop down before much dispersion of the pollutants has occurred.

The basic model equation used in this analysis assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution about the centerline of the plume. Concentrations at any location downwind of a point source such as a stack can be determined from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma_y)^2}\right) * \left[\left\{e^{-1/2(z-H/\sigma_z)^2}\right\} + \left\{e^{-1/2(z+H/\sigma_z)^2}\right\}\right]$$

where:

C = the concentration in the air of the substance or pollutant in question

Q = the pollutant emission rate

$\sigma y \sigma z$ = the horizontal and vertical dispersion coefficients, respectively, at downwind distance x

u = the wind speed at the height of the plume center

x,y,z = the variables that define the 3-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack

H = the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises due to the momentum and/or buoyancy of the plume)

Gaussian dispersion models are approved by USEPA for regulatory use and are based on conservative assumptions (i.e., the models tend to overpredict actual impacts by assuming steady-state conditions, no pollutant loss through conservation of mass, no chemical reactions, etc.). The USEPA models were used to determine if ambient air quality standards would be exceeded, and whether a more accurate and sophisticated modeling procedure would be warranted to make the impact determination. The following sections describe:

- Screening modeling procedures
- Refined air quality impact analysis
- Existing ambient pollutant concentrations and preconstruction monitoring
- Results of the ambient air quality modeling analyses
- PSD increment consumption

The screening and refined air quality impact analyses were performed using the Industrial Source Complex, Short-Term Model ISCST3 (Version 02035). ISCST3 is a Gaussian dispersion model capable of assessing impacts from a variety of source types in areas of simple, intermediate, and complex terrain. The model can account for settling and dry deposition of particulates; area, line, and volume source types; downwash effects; and gradual plume rise as a function of downwind distance. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to one year).

Inputs required by the ISCST3 model include the following:

- Model options
- Meteorological data
- Source data
- Receptor data

Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Examples of model options include use of site-specific vertical profiles of wind speed and temperature; consideration of stack and building wake effects; and time-dependent exponential decay of pollutants. The model supplies recommended default options for the user. Except where explicitly stated, such as for building downwash, as described in more detail below, default values were used. A number of these default values are required for USEPA and local District approval of model results and are listed below.

- Urban dispersion coefficients (see discussion below)
- Gradual plume rise
- Stack tip downwash
- Buoyancy induced dispersion
- Calm processing
- Default urban wind profile exponents
- Default vertical temperature gradients = 0.02, 0.035
- 10-meter anemometer height

Radian International prepared a land use analysis for the Southern Energy California (SECAL) Potrero Power Plant Unit 7 project, using the Auer (1978) land use classification system, to determine whether the area around the Potrero power plant site is predominantly rural or urban. As the SFERP is proposed for the same area, the land use analysis performed for Potrero Unit 7 can be relied upon to make a land use determination for this project. The Radian analysis determined that the land use surrounding the site is greater than 50 percent urban; therefore, for this modeling analysis, urban dispersion coefficients have been used.

ISCST3 uses hourly meteorological data to characterize plume dispersion. The representativeness of the data is dependent on the proximity of the meteorological monitoring site to the area under consideration, the complexity of the terrain, the exposure of the meteorological monitoring site, and the period of time during which the data are collected. The meteorological data used in this analysis were collected at the Potrero power plant monitoring station adjacent to the project site. This data set was selected to be representative of meteorological conditions at the SFERP site and to meet the requirements of the USEPA "Onsite Meteorological Program Guidance for Regulatory Model Applications" (EPA-450/4-87-013, August 1995). The analysis used meteorological data collected during 1992.

The required emission source data inputs to ISCST3 include source locations, source elevations, stack heights, stack diameters, stack exit temperatures and velocities, and emission rates. The source locations are specified for a Cartesian (x,y) coordinate system where x and y are distances east and north in meters, respectively. The Cartesian coordinate system used is the Universal Transverse Mercator Projection (UTM). The stack height that can be used in the model is limited by federal and BAAQMD Good Engineering Practice (GEP) stack height restrictions, discussed in more detail below. In addition, ISCST3 requires nearby building dimension data to calculate the impacts of building downwash.

For the purposes of modeling, a stack height beyond what is required by Good Engineering Practices is not allowed (BAAQMD Regulation 2-2-418). However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling analyses is the height necessary to ensure that emissions from the stack do not result in

excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP. The USEPA guidance ("Guideline for Determination of Good Engineering Practice Stack Height," Revised 6/85) for determining GEP stack height indicates that GEP is the lesser of 65 meters or H_g, where H_g is calculated as follows:

$$H_g = H + 1.5L$$

where:

H_g = Good Engineering Practice stack height, measured from the ground-level elevation at the base of the stack

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack

L = lesser dimension, height or maximum projected width, of nearby structure(s)

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

For the two northernmost turbine stacks, the nearby (influencing) structure is the offsite fuel storage tank northeast of the project site, which is 65 feet (19.81 m) high and 173 feet (52.9 m) in diameter. Thus H = L = 65 feet, and $H_g = 2.5 * 65 = 162.5$ ft, so the proposed stack height of 85 feet does not exceed GEP stack height. For the southernmost turbine stack, the nearby (influencing) structure is an offsite building south of the facility, which is 51.0 feet (15.6 m) high, 124.6 feet (38.0 m) wide and 298.0 ft (90.9 m) long. Thus, H generally equals L = 51.0 feet, and $H_g = 2.5 * 51.0 = 127.5$ ft, so the proposed stack height of 85 feet does not exceed GEP stack height.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the downwind distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building. Building dimensions for the buildings analyzed as downwash structures were obtained from plot plans. The building dimensions were analyzed using the Building Profile Input Program (BPIP) to calculate 36 wind-direction-specific building heights and projected building widths for use in building wake calculations. The building dimensions used in the GEP analysis are shown in Appendix 8.1B, Table 8.1B-1 and Figure 8.1B-1.

Screening Procedures and Unit Impact Modeling

To ensure the impacts analyzed were for maximum emission levels and worst-case dispersion conditions, a screening procedure was used to determine the inputs to the impact modeling. The screening procedure analyzed the turbine operating conditions that would result in the maximum impacts on a pollutant-specific basis. The operating conditions examined in this screening analysis, along with their exhaust and emission characteristics, are shown in Appendix 8.1B, Table 8.1B-2. These operating conditions represent turbine

operation at maximum, typical, and minimum ambient operating temperatures (80°F, 59°F, and 36°F), and at full and minimum (50 percent) loads.

Ambient impacts for each of the six operating cases were modeled using USEPA's ISCST3 model and one year of onsite meteorological data, as described above. The results of the unit impact analysis are presented in Appendix 8.1B, Table 8.1B-3. The analysis showed that for most pollutants and averaging period, modeled impacts were highest under full load operating conditions, while PM_{10} impacts were highest under minimum load conditions. The Case 6 (for annual average) stack parameters and emission rates were used in the refined modeling analysis to evaluate the combined impacts of the turbines and cooling towers. For the unit impacts analysis, the CEC staff's recommendation regarding receptor grid spacing has been followed.[3]

Refined Air Quality Impact Analysis

The stack parameters and emission rates used to model PM_{10} impacts from the SFERP combustion turbines and cooling towers are shown in Appendix 8.1B, Table 8.1B-4. As discussed above, the turbine stack parameters for Case 6 were used in modeling 24-hour and annual average impacts for PM_{10}. The model receptor grids were derived from 30-meter DEM data. The CEC guidance cited above was used to locate receptors. Twenty-five-meter refined receptor grids were used in areas where the coarse grid analyses indicated modeled maxima for each site plan would be located. A map showing the layout of each receptor grid around the site plan is presented in Figure 8.1B-2, Appendix 8.1B.

The unit impact/screening and refined analyses included simple, intermediate, and complex terrain. Terrain features were taken from USGS DEM data and 7.5-minute quadrangle maps of the area including San Francisco North, San Francisco South, Oakland West, Oakland East, Hunters Point and San Leandro. The coarse grid contained 6,561 receptors at 250-meter resolution and a semi-coarse near-facility grid contained 527 receptors at 100-meter resolution. The refined grids contained 24,184 receptors at 25-meter resolution. In addition, adjacent to the fenceline, four tiers of 183 receptors were present, at 25-meter resolution, for a total of 31,455 receptors.

Specialized Modeling Analyses

Fumigation Modeling. Fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may be drawn to the ground, causing high ground-level pollutant concentrations. Although fumigation conditions rarely last as long as one hour, relatively high ground-level concentrations may be reached during that time. For this analysis, fumigation was assumed to occur for up to 90 minutes, per USEPA guidance.

The SCREEN3 model was used to evaluate maximum ground-level concentrations for short-term averaging periods (24 hours or less). Although this modeling analysis is not required by District regulation, guidance from the BAAQMD staff (BAAQMD, 2004) and USEPA (USEPA, 1992) were followed in evaluating fumigation impacts. Since SCREEN3 is a single-source model, a single turbine was modeled and the results multiplied by three. The maximum fumigation impact from the turbines occurred approximately 19 km from the facility. This analysis, which is shown in more detail in Appendix 8.1B, Table 8.1B-5, showed

[3] "SFPUC, San Francisco Electric Reliability Power Project: Final Modeling Protocol," November 2003: 25-meter resolution along the facility fenceline to 100 meters from the fenceline, 100-meter resolution from 100 meters to 1,000 meters from the fenceline, and 250-meter spacing out to as far as 10 km from the site.

that impacts under fumigation conditions are expected to be lower than the maximum concentrations calculated by ISC under downwash conditions.

Shoreline Fumigation Modeling. Shoreline fumigation modeling is used to determine the impacts as a result of over-water plume dispersion. Because land surfaces tend to both heat and cool more rapidly than water, shoreline fumigation tends to occur on sunny days when the denser cooler air over water displaces the warmer, lighter air over land. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between the stable air over the water and the unstable air over the land and the wind speed determine if the plume will loop down before much dispersion of the pollutants has occurred.

SCREEN3 can examine sources within 3,000 meters of a large body of water, and was used to calculate the maximum shoreline fumigation impact. The model uses a stable onshore flow and a wind speed of 2.5 meters per second; the maximum ground-level shoreline fumigation concentration is assumed by the model to occur where the top of the stable plume intersects the top of the well-mixed thermal inversion boundary layer (TIBL). The model TIBL height was varied in accordance with BAAQMD procedures (between 2 and 6) to determine the highest shoreline fumigation impact. The worst-case (highest) impact was used in the determining facility impacts due to shoreline fumigation. Shoreline breakup fumigation was assumed to persist for up to 3 hours, in accordance with the meteorological data analysis performed by Dames and Moore for the Potrero 7 application. The shoreline fumigation modeling analysis is shown in more detail in Table 8.1B-6, Appendix 8.1B.

Turbine Startup. Facility impacts were also evaluated during the startup of three turbines simultaneously to evaluate short-term impacts under worst-case startup emissions. Emission rates used for this scenario were based on an engineering analysis of available data, which included source test data from startups of the LM6000PC combustion turbines at the Los Esteros Critical Energy Facility. Turbine exhaust parameters for 50 percent load operation (Cases 4, 5, and 6) were used to characterize turbine exhaust during startup and the CO and NO_x emission rates from Table 8.1-17 were used. Startup impacts were evaluated for the 1-hour averaging period using the unit impact modeling results discussed earlier. The calculation of startup impacts is shown in Table 8.1B-3, Appendix 8.1B.

Ozone Limiting. Because the NO_x impacts during facility operation are shown by the modeling to be relatively low, it is assumed that no ozone limiting of NO_x emissions from project operation will occur and the results are reported without ozone correction for either the 1-hour or annual impacts.

In accordance with guidance provided by the BAAQMD staff for similar projects, 1-hour NO_2 impacts during construction were modeled using ISC3_OLM (Industrial Source Complex, Version 3, Ozone Limiting Method) Model (version 96113). While this version of ISCST3 is not based on the latest model ISCST3 update, this modeling analysis does not include any features that were affected by recent model updates.

ISC3_OLM uses hourly ozone data to perform ozone-limiting calculations on individual plumes on an hour-by-hour basis. In accordance with guidance provided by the BAAQMD staff for similar projects, the concurrent ozone data collected at the nearest monitoring station to the SFERC, on Arkansas Street, were used for this analysis. Annual NO_x impacts during

construction were modeled using ISCST3. NO_x impact were converted to NO_2 using the USEPA-guidance Ambient Ratio Method and the nationwide default conversion rate of 0.75.

Turbine Commissioning. There are several high emissions scenarios possible during commissioning. The first is the period prior to SCR system and oxidation catalyst installation, when the combustor is being tuned. Under this scenario, NO_x emissions would be high because the NO_x emissions control system would not be functioning and because the combustor would not be tuned for optimum performance. CO emissions would also be high because combustor performance would not be optimized and the CO emissions control system would not be functioning. The second high emissions scenario may occur when the combustor has been tuned but the SCR and oxidation catalyst installation is not complete, and other parts of the turbine operating system are being checked out. Since the combustor would be tuned but the control system installation would not be complete, NO_x and CO levels would again be high. Commissioning activities and expected emissions are discussed in more detail below.

Preconstruction Monitoring

To ensure that the impacts from the SFERC combustion turbines will not cause or contribute to a violation of an ambient air quality standard or an exceedance of a PSD increment, an analysis of the existing air quality in the project area is necessary. If a source is subject to PSD review, BAAQMD rules require preconstruction ambient air quality monitoring data for the purposes of establishing background pollutant concentrations in the impact area (Regulation 2-2-414.3). However, a facility may be exempted from this requirement if the predicted air quality impacts of the facility do not exceed the de minimis levels listed in Table 8.1-21. As the SFERC is not subject to PSD review, the preconstruction monitoring requirements are not applicable to the project.

TABLE 8.1-21
BAAQMD PSD Preconstruction Monitoring Exemption Levels

Pollutant	Averaging Period	De minimis Level
CO	8-hr average	575 $\mu g/m^3$
PM_{10}	24-hr average	10 $\mu g/m^3$
NO_2	annual average	14 $\mu g/m^3$
SO_2	24-hr average	13 $\mu g/m^3$

With the District's approval, a facility may rely on air quality monitoring data collected at District monitoring stations to satisfy the requirement for preconstruction monitoring. In such a case, in accordance with Section 2.4 of the USEPA PSD guideline, the last 3 years of ambient monitoring data may be used if they are representative of the area's air quality where the maximum impacts occur due to the proposed source.

The background data need not be collected onsite, as long as the data are representative of the air quality in the subject area (40 CFR 51, Appendix W, Section 9.2). Three criteria are applied in determining whether the background data are representative: (1) location,

(2) data quality, and (3) data currentness (USEPA, 1987). These criteria are defined as follows:

- **Location:** The measured data must be representative of the areas where the maximum concentration occurs for the proposed stationary source, existing sources, and a combination of the proposed and existing sources.
- **Data quality:** Data must be collected and equipment must be operated in accordance with the requirements of 40 CFR Part 58, Appendices A and B, and PSD monitoring guidance.
- **Currentness:** The data are current if they have been collected within the preceding 3-years and they are representative of existing conditions.

Although the SFERP is not subject to PSD review and thus not required to follow this guidance, all of the data used in this analysis meet the requirements of Appendices A and B of 40 CFR Part 58, and thus all meet the criterion for data quality. All of the data have been collected within the preceding 3 years, and thus all meet the criterion for currentness.

Ambient NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$ data are collected at the Arkansas Street monitoring station. This monitoring station is located less than 1½ miles northwest of the project site. The ambient pollution levels monitored at the Arkansas Street monitoring station reflect concentrations in the vicinity of the project, and thus meet the criterion for location. CO levels are affected mainly by vehicle traffic, so CO concentrations monitored in the urbanized Arkansas Street location are expected to conservatively represent CO levels in the project area. There are no local sources of SO_2 in either location that would be expected to affect monitored concentrations. Therefore, the Arkansas Street station provides representative background data for assessing the SO_2 impacts of the project, and thus meets the location criterion.

Results of the Ambient Air Quality Modeling Analyses

The maximum facility impacts calculated from the ISCST3 and fumigation modeling analyses described above are summarized in Table 8.1-22. The highest modeled impacts are expected to occur under startup and shoreline fumigation conditions.

Even if the project were subject to PSD review, preconstruction monitoring would not be required because the maximum ambient impacts do not exceed de minimis levels, as shown in Table 8.1-23.

TABLE 8.1-22
Results of the Ambient Air Quality Modeling Analysis

		Modeled Concentration ($\mu g/m^3$)			
Pollutant	Averaging Time	Normal Operation	Startup	Inversion Breakup Fumigation	Shoreline Fumigation
NO_2	1-hour	8.3	114.7 [a]	1.6 [c]	10.6 [c]
	Annual	0.1			

TABLE 8.1-22
Results of the Ambient Air Quality Modeling Analysis

Pollutant	Averaging Time	Modeled Concentration ($\mu g/m^3$)			
		Normal Operation	Startup	Inversion Breakup Fumigation	Shoreline Fumigation
SO_2	1-hour	0.8	[b]	0.2	1.1
	3-hour	0.6	[b]	0.1	1.0
	24-hour	0.1	[b]	0.05	0.1
	Annual	0.006	[b]	–[c]	–[c]
CO	1-hour	8.1	28.7	1.6	10.3
	8-hour	5.2	[a]	0.9	3.2
$PM_{2.5}/PM_{10}$ (including cooling tower)[d]	24-hour	1.0	[b]	0.3	0.6
	Annual	0.1	[b]	–[c]	–[c]

[a] Not applicable, because startup emissions are included in the 8-hour and longer-term ("Normal Operation") modeling.
[b] Not applicable, because emissions are not elevated above normal levels during startup.
[c] Not applicable, because inversion breakup and shoreline fumigation are short-term phenomena and as such are evaluated only for short-term averaging periods.
[d] Cooling tower not included in fumigation modeling.

TABLE 8.1-23
Evaluation Of Preconstruction Monitoring Requirements

Pollutant	Averaging Time	Exemption Concentration ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	Exceed Monitoring Threshold?
NO_x	annual	14	0.1	no
SO_2	24-hr	13	0.1	no
CO	8-hr	575	5.2	no
PM_{10}	24-hr	10	1.0	no

Impacts During Turbine Commissioning

As discussed above, NO_2 and CO impacts could be higher during commissioning than under other operating conditions already evaluated. The commissioning period for the project is comprised of several equipment tests. These tests and the associated NO_x and CO emissions are briefly summarized below. The emissions calculations are shown in more detail in Table 8.1B-7, Appendix 8.1B.

- **Full Speed No Load Tests (FSNL)**—The tests include a test of the combustion turbine ignition system, a test to ensure that the CTG is synchronized with its electric generator, and a test of the CTG's overspeed system. During the tests, the heat input to the CTG will be approximately 100 MMBtu/hr or 20 percent of the maximum heat input rating. Worst-case NO_x emission concentrations are expected to be 100 ppm at 15 percent oxygen, or 35.3 lb/hr at 97 MMbtu/hr. Total operating time for these tests is expected to

be about 4 hours per unit (12 hours total), resulting in maximum total NO_x emissions of 424 pounds. Maximum CO emissions are assumed to be 120 ppm at 15 percent oxygen, or 25.7 lb/hr at 97 MMbtu/hr, for a total of 308 pounds CO for the period.

- **Minimum Load Tests**—These tests will occur over several days. During this testing period the CTG combustor water injection rates will be tuned to minimize emissions and water line checks will be performed. This test period will allow for complete combustion path warm-up, required for removing all debris that could potentially damage the SCR and CO catalysts. During the tests, the heat input to the combustion turbine will be approximately 100 MMBtu/hr or 20 percent of the maximum heat input rating. The average NO_x emission concentration for the period is assumed be 42 ppm at 15 percent oxygen (due to water injection control) at a heat input of 97 MMBtu/hr, or 15 lb/hr NO_x. Total testing is estimated to last approximately 20 hours per unit, or 60 hours, for a total of 900 pounds of NO_x. The worst case CO emission rate is assumed to be equivalent to 17 times the controlled emission rate (14.6 lb/hr), for a total of 876 pounds CO for the period.

- **Full Speed, No Load Tests (SCR Not Operational)**—These tests will occur over approximately a 4-day period. By the beginning of this test period, the water injection at the CTG combustor will be completely tuned. The SCR and CO catalyst will be installed during this testing period, but no ammonia will be injected. During the tests, the heat input to the CTG will be approximately 100 MMBtu/hr or 20 percent of the maximum heat input rating. Testing and commissioning of the spray water (SPRINT) power augmentation system on the CTG combustor will also take place during this second FSNL test. The average NO_x emission concentration for the period is assumed be 30 ppm at 15 percent oxygen (water injection control) at 100 MMBtu/hr, or 35.3 lb/hr NO_x. Total testing is estimated to last up to 24 hours for each CTG, for a total of approximately 2,550 pounds of NO_x from all three units. Again, the worst case CO emission rate is assumed to be equivalent to 17 times the controlled emissions (25.7 lb/hr), for a total of approximately 1,850 pounds of CO for the period.

- **Multiple Load Tests (SCR and Oxidation Catalyst Fully Operational)**—These tests will occur over approximately a 13-day period. By the beginning of this test period the control systems will be completely tuned and achieving NO_x and CO control at design levels. During the tests, the heat input to each combustion turbine will be approximately 487.3 MMBtu/hr or 100 percent of the maximum heat input rating.

Total heat rate will vary between about 10,000 Btu/kWh and 14,000 Btu/kWh (HHV) during commissioning activities. Average heat rate for the entire commissioning period is expected to be about 10,000 Btu/kWh to 12,000 Btu/kWh (HHV).

The maximum modeled NO_2 and CO impact during commissioning will occur under the turbine operating conditions that are least favorable for dispersion. As shown in the unit impacts analysis, these conditions are expected to occur under part-load, high-temperature conditions (Case 6).

The unit impact modeling results for three turbines emitting 1 g/s each under Case 6 (see Table 8.1B-3, Appendix 8.1B) can be scaled using a NO_x emission rate of 4.45 g/s (35.3 lb/hr) to determine that the maximum modeled 1-hour NO_2 impact during commissioning of three turbines is not expected to exceed approximately 101 $\mu g/m^3$. Using the background NO_2

concentration of 141 $\mu g/m^3$, the total impact will not exceed 242 $\mu g/m^3$, which is well below the state 1-hour NO_2 standard of 470 $\mu g/m^3$. The turbine screening results can also be scaled to determine that maximum 1-hour CO impacts during commissioning of three turbines are not expected to exceed 74 $\mu g/m^3$. Combined with the background concentration of 6,875 $\mu g/m^3$, the total impact will not exceed 6,949 $\mu g/m^3$, which is well below the state 1-hour CO standard of 23,000 $\mu g/m^3$.

Ambient Air Quality Impacts

To determine a project's air quality impacts, the modeled concentrations are added to the maximum background ambient air concentrations and then compared to the applicable ambient air quality standards. The modeled concentrations have already been presented in earlier tables. The maximum background ambient concentrations are listed in the following text and tables. A detailed discussion of why the data collected at these stations are representative of ambient concentrations in the vicinity of the project was provided above.

Table 8.1-24 presents the maximum concentrations of NO_x, CO, SO_2, PM_{10} and $PM_{2.5}$ recorded between 2000 through 2002 from the Arkansas Street monitoring station.

TABLE 8.1-24
Maximum Background Concentrations, 2000-2002 ($\mu g/m^3$)

Pollutant	Averaging Time	2000	2001	2002
NO_2	1-hour	139	137	141
	8-hour	38	36	36
SO_2	1-hour	49	65	138
	24-hour	21.0	21.0	18.4
	Annual	5.3	5.3	5.3
CO	1-hour	6,875	5,000	4,375
	8-hour	3,544	3,644	2,856
PM_{10}	24-hour	63	67	74
	Annual	24.3	26.3	24.7
$PM_{2.5}$	24-hour	48	77	70
	Annual	11.4	11.5	13.1

Maximum ground-level impacts due to operation of the SFERP are shown together with the ambient air quality standards in Table 8.1-25. Using the conservative assumptions described earlier, the results indicate that the SFERP will not cause or contribute to violations of any state or federal air quality standards, with the exception of the state PM_{10} and state and federal $PM_{2.5}$ standards. For these pollutants, existing concentrations already exceed the state standards.

TABLE 8.1-25
Modeled Maximum Impacts from Facility

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	114.7*	141	256	470	–
	Annual	0.1	38	38	–	100
SO_2	1-hour	1.1	138	139	650	–
	24-hour	0.1	21	21	109	365
	Annual	0.006	5.3	5.3	–	80
CO	1-hour	28.7	6,875	6,904	23,000	40,000
	8-hour	5.2	3,644	3,649	10,000	10,000
PM_{10}	24-hour	1.0	74	75.0	50	150
	Annual	0.1	24.7	24.8	20	50
$PM_{2.5}$	24-hour	1.0	77	78.0	–	65
	Annual	0.1	13.1	13.2	12	15

* Maximum 1-hour NO_2 impact shown occurs only during simultaneous startup of three turbines. Maximum impact during routine turbine operation will be approximately 8 $\mu g/m^3$.

PSD Increment Consumption

The Prevention of Significant Deterioration (PSD) program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded the National Ambient Air Quality Standards (NAAQS). For the purposes of determining applicability of the PSD program requirements, the following regulatory procedure is used:

- SFERP facility-wide emissions are compared with regulatory significance thresholds to determine whether the facility is major and thus may be subject to PSD. If the facility emissions exceed these thresholds, it is a major facility. The comparison in Table 8.1-26 indicates that the SFERP will not be a major facility and thus is not subject to PSD.
- If an ambient impact analysis is required, the analysis is first used to determine if the impact levels are significant. The determination of significance is based on whether the impacts exceed established significance levels (BAAQMD Rule 2.2-233) shown in Table 8.1-27. If the significance levels are not exceeded, no further analysis is required.
- If the significance levels are exceeded, an analysis is required to demonstrate that the allowable increments will not be exceeded, on a pollutant-specific basis. Increments are the maximum increases in concentration that are allowed to occur above the baseline concentration. These PSD increments are also shown in Table 8.1-27.

Table 8.1-26 shows that the proposed project will not be a major stationary source and will not be subject to PSD review because facility emissions of all pollutants are below the 100-tpy major facility and the PSD significance thresholds.

TABLE 8.1-26
PSD Significant Emissions Levels

Pollutant	Facility Emissions (tpy)	PSD Threshold (tpy)	Significant?
NO_x	39.8	250	No
SO_2	2.7	250	No
POC	7.7	250	No
CO	27.9	250	No
PM_{10}*	18.2	250	No

* PM_{10} emissions shown include cooling tower.

TABLE 8.1-27
BAAQMD PSD Levels of Significance

Pollutant	Averaging Time	Significant Impact Levels	Maximum Allowable Increments
NO_2	1-hour	19 $\mu g/m^3$	N/A*
	Annual	1 $\mu g/m^3$	25 $\mu g/m^3$
SO_2	3-hour	25 $\mu g/m^3$	512 $\mu g/m^3$
	24-hour	5 $\mu g/m^3$	91 $\mu g/m^3$
	Annual	1 $\mu g/m^3$	20 $\mu g/m^3$
CO	1-hour	2,000 $\mu g/m^3$	N/A
	8-hour	500 $\mu g/m^3$	N/A
PM_{10}	24-hour	5 $\mu g/m^3$	30 $\mu g/m^3$
	Annual	1 $\mu g/m^3$	17 $\mu g/m^3$

* The significance level for 1-hour average NO_2 is a BAAQMD level only; there is no corresponding federal significance level.

The maximum modeled impacts from the SFERP facility are compared with the significance levels in Table 8.1-28. These comparisons show that the proposed project exceeds only the BAAQMD 1-hour average NO_2 significance level, and only during startup of three turbines simultaneously. During routine plant operations, maximum 1-hour NO_2 concentrations will be below the BAAQMD significance threshold. As discussed previously, however, the project emissions are below levels that would trigger PSD review either by USEPA or by the BAAQMD, so no further analysis of modeled impacts is required.

TABLE 8.1-28
Comparison of Maximum Modeled Impacts and PSD Significance Thresholds

Pollutant	Averaging Time	Maximum Modeled Impacts ($\mu g/m^3$)	Significance Threshold ($\mu g/m^3$)	Significant?
NO_2	1-hour	114.7*	19	yes
	Annual	0.1	1	no
SO_2	3-hour	1.0	25	no
	24-hour	0.1	5	no
	Annual	0.006	1	no
CO	1-hour	28.7	2,000	no
	8-hour	5.2	500	no
PM_{10}	24-hour	1.0	5	no
	Annual	0.1	1	no

* NO_2 impact shown occurs only during the startup of three turbines simultaneously. Under typical operating conditions, 1-hour average NO_2 concentration will be 8.3 $\mu g/m^3$.

8.1.5.4 Screening Health Risk Assessment

The screening health risk assessment (SHRA) was conducted to determine expected impacts on public health of the noncriteria pollutant emissions from the facility. The SHRA was conducted in accordance with the CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines (October 1993) and the Bay Area Air Quality Management District "Risk Management Procedure" Policy (May 1991). The SHRA estimated the offsite cancer risk to the maximally exposed individual (MEI), as well as indicated any adverse effects of non-carcinogenic compound emissions. The CARB/OEHHA Health Risk Assessment computer program was used to evaluate multipathway exposure to toxic substances. Because of the conservatism (overprediction) built into the established risk analysis methodology, the actual risks will be lower than those estimated.

A health risk assessment requires the following information:

- Unit risk factors (or carcinogenic potency values) for any carcinogenic substances that may be emitted
- Noncancer Reference Exposure levels (RELs) for determining non-carcinogenic health impacts
- 1-hour and annual average emission rates for each substance of concern
- The modeled maximum offsite concentration of each of the pollutants emitted

Pollutant-specific unit risk factors are the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70-year lifetime. The SHRA uses unit risk factors specified by the California Office of Environmental Health Hazard Assessment (OEHHA). The excess cancer risk for each pollutant emitted is the product of the unit risk factor and the modeled concentration. All of the pollutant excess cancer risks are assumed to be additive.

An evaluation of the potential noncancer health effects from long-term (chronic) and short-term (acute) exposures has also been included in the SHRA. Many of the carcinogenic compounds are also associated with noncancer health effects and are therefore included in the determination of both cancer and noncancer effects. RELs are used as indicators of potential adverse health effects. RELs are generally based on the most sensitive adverse health effect reported and are designed to protect the most sensitive individuals. The OEHHA reference exposure levels were used to determine any adverse health effects from noncarcinogenic compounds. A hazard index for each noncancer pollutant is then determined by the ratio of the pollutant annual average concentration to its respective REL for a chronic evaluation. The individual indices are summed to determine the overall hazard index for the project. Because noncancer compounds do not target the same system or organ, this sum is considered conservative. The same procedure is used for the acute evaluation.

The SFERP SHRA results are compared with the established risk management procedures for the determination of acceptability. The established risk management criteria provide that if the potential increased cancer risk is less than one in a million, the facility risk is considered not significant.

The SHRA includes the noncriteria pollutants listed above in Table 8.1-22. The receptor grid described earlier for criteria pollutant modeling was used for the SHRA. The SHRA results for the SFERP are presented in Table 8.1-29, and the detailed calculations are provided in Appendix 8.1C. The locations of the maximum modeled risks are shown in Figure 8.1C-1.

TABLE 8.1-29
Screening Health Risk Assessment Results

Excess Cancer Risk to Maximally Exposed Individual:	0.02 in one million
Excess Cancer Risk at Nearest Residence:	0.01 in one million
Excess Cancer Risk at Nearest Workplace:	0.003 in one million
Acute Inhalation Hazard Index:	0.03
Chronic Inhalation Hazard Index:	0.002

* REL: Reference Exposure Level.

The screening HRA results indicate that the acute and chronic hazard indices are well below 1.0. In addition, the maximum chronic noninhalation exposure is well below the REL. The excess cancer risk to a maximally exposed individual is 0.02 in one million, well below the one in one million level.

8.1.5.5 Construction Impacts Analysis

Emissions due to the construction phase of the project have been estimated, including an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A dispersion modeling analysis was conducted based on these emissions. A detailed analysis of the emissions and ambient impacts is included in Appendix 8.1D. The results of the analysis indicate that the maximum construction impacts will be below the state and federal standards for all the criteria pollutants emitted. The best available emission control techniques will be used. The SFERP construction site impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards. The City will reduce impacts by implementing dust reduction measures set forth in the Environmental Code, Chapter 10 and in Department of Public Works Order 171,378 during construction.

Combustion diesel PM_{10} emission impacts have also been evaluated to demonstrate that the carcinogenic risk from construction activities will be below one in one million at all receptors. This risk screening analysis is also included in Appendix 8.1D.

8.1.6 Consistency with Laws, Ordinances, Regulations and Standards

8.1.6.1 Consistency with Federal Requirements

The Bay Area Air Quality Management District (District) has been delegated authority by the USEPA to implement and enforce most federal requirements that may be applicable to the SFERP, including the new source performance standards and new source review for nonattainment pollutants. Compliance with the District regulations ensures compliance and consistency with the corresponding federal requirements as well. The SFERP will also be required to comply with the Federal Acid Rain requirements (Title IV). Since the District has received delegation for implementing Title IV through its Title V permit program, the

SFERP will secure a District Title V permit that imposes the necessary requirements for compliance with the Title IV Acid Rain provisions.

8.1.6.2 Consistency with State Requirements

State law sets up local air pollution control districts and air quality management districts with the principal responsibility for regulating emissions from stationary sources. As discussed above, the SFERP is under the local jurisdiction of the District, and compliance with District regulations will ensure compliance with state air quality requirements.

8.1.6.3 Consistency with Local Requirements: Bay Area Air Quality Management District (District)

The District has been delegated responsibility for implementing local, state, and federal air quality regulations in portions of the nine counties surrounding San Francisco Bay. The SFERP project is subject to District regulations that apply to new sources of emissions, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from toxic air pollutants. The following sections include the evaluation of facility compliance with the applicable District requirements.

Under the regulations that govern new sources of emissions, the SFERP is required to secure a preconstruction Determination of Compliance from the District (Regulation 2, Rule 3), as well as demonstrate continued compliance with regulatory limits when the facility becomes operational. The preconstruction review includes demonstrating that the combustion turbines will use best available control technology (BACT) and will provide any necessary emission offsets.

Applicable BACT levels are shown in Table 8.1-30, along with anticipated potential facility emissions. BAAQMD Rule 2-2-301 requires the SFERP to apply BACT to any source that has an increase in emissions of NO_x, POC, SOx, CO, and PM_{10} (criteria pollutants) and that has a potential to emit in excess of 10.0 pounds per highest day. Rule 2.2-301.2 imposes BACT for emissions of lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds when emitted in excess of specified amounts. The SFERP facility will not emit any of these latter pollutants in detectable quantities; therefore, Rule 2-2-301.2 is not applicable to the proposed project. As shown in the table, BACT is required for NO_x, POC, SO_2, CO, and PM_{10}. The calculation of facility emissions was discussed in AFC Subsection 8.1.5.1.1.

TABLE 8.1-30
Facility Best Available Control Technology Requirements

Pollutant	Applicability Level	Facility Emission Level (lbs/day)	BACT Required?
Criteria Pollutants: District Regulation 2-2-301.1			
POC	10 lbs/day	97.8	yes
NPOC	10 lbs/day	–	no
NO_x	10 lbs/day	744.6	yes
SO_2	10 lbs/day	32.3	yes
PM_{10}	10 lbs/day	216.9	yes

TABLE 8.1-30
Facility Best Available Control Technology Requirements

Pollutant	Applicability Level	Facility Emission Level (lbs/day)	BACT Required?
CO	10 lbs/day	378.0	yes
Noncriteria Pollutants: District Regulation 2-2-301.2			
Lead	3.2 lbs/day	neg.	no
Asbestos	0.04 lbs/day	neg.	no
Beryllium	0.002 lbs/day	neg.	no
Mercury	0.5 lbs/day	neg.	no
Fluorides	16 lbs/day	neg.	no
Sulfuric Acid Mist	38 lbs/day	neg.	no
Hydrogen Sulfide	55 lbs/day	neg.	no
Total Reduced Sulfur	55 lbs/day	neg.	no
Reduced Sulfur Compounds	55 lbs/day	neg.	no

BACT for the applicable pollutants was determined by reviewing the District BACT Guidelines Manual, the South Coast Air Quality Management District BACT Guidelines Manual, the most recent Compilation of California BACT Determinations, CAPCOA (2nd Ed., November 1993), and USEPA's BACT/LAER Clearinghouse. A summary of the review is provided in Appendix 8.1E. For the combustion turbines, the District considers BACT to be the most stringent level of demonstrated emission control that is feasible. The SFERP facility will use the BACT measures discussed below.

As a BACT measure, the SFERP will limit the fuels burned in the new combustion turbines to natural gas, a clean burning fuel. Burning of liquid fuels in the combustion turbine combustors would result in greater criteria pollutant emissions than if the units burned only gaseous fuels. This measure acts to minimize the formation of all criteria air pollutants.

BACT for NO_x emissions from the combustion turbines will be the use of low NO_x emitting equipment and add-on controls. The SFERP will use a selective catalytic reduction (SCR) system to reduce NO_x emissions to 2.5 ppmvd NO_x, corrected to 15 percent O_2 on a 3-hour average basis. The District BACT guidelines indicate that BACT from large, simple-cycle combustion turbines (≥40 MMBtu/hr heat input) is an exhaust concentration of 2.5 ppmvd NO_x, corrected to 15 percent O_2; therefore, the proposed combustion turbines will meet the BACT requirements for NO_x. The District BACT Guideline determination for NO_x from combustion turbines is shown in Appendix 8.1E.

BACT for CO emissions will be achieved by using oxidation catalysts to reduce CO emissions to 4.0 ppmvd, corrected to 15 percent O_2. Recent District BACT determinations indicate that BACT from large, simple-cycle combustion turbines (≥40 MMBtu/hr heat input) is 6 ppmvd CO, corrected to 15 percent O_2. A review of recent BACT determinations for CO from combustion turbines is provided in Appendix 8.1E.

BACT for POC emissions will be achieved by use of good combustion practices in the combustion turbines. BACT for POC emissions from combustion devices has historically been the use of best combustion practices. POC emissions leaving the stacks will not exceed 2.0 ppmvd, corrected to 15 percent oxygen. This level of emissions is consistent with recent BACT determinations for similar projects.[4]

For the turbines, BACT for PM_{10} is best combustion practices and the use of gaseous fuels.

District BACT Guideline 89.1.6 specifies BACT 2 (achieved in practice) for SO_2 for combined-cycle combustion turbines with an output rating of ≥ 50 MW as the exclusive use of clean-burning natural gas with a sulfur content of < 1.0 grains per 100 scf. The proposed turbines will burn exclusively PUC-regulated natural gas with an expected average sulfur content of 0.33 grains per 100 scf, which will result in minimal SO_2 emissions.

In addition to the BACT requirements, District regulation 2-2-302 requires the project to provide full emission offsets when emissions exceed specified levels on a pollutant-specific basis. As shown in Table 8.1-31, the SFERP will be required to provide emission offsets for NO_x emissions.

TABLE 8.1-31
BAAQMD Offset Requirements and Facility Emissions

Pollutant	Applicable Facility Size	Emission Increase	Facility Emissions	Regulation	Offsets Required
POC	15 tpy	Any increase	7.7 tpy	2-2-302	No
NO_x	15 tpy	Any increase	39.8 tpy	2-2-302	Yes
PM_{10}	100 tpy	1 tpy net increase	18.2 tpy	2-2-303	No
SO_2	100 tpy	1 tpy net increase	2.7 tpy	2-2-303	No

Section 2-302 requires NO_x emission reduction credits to be provided at an offset ratio of 1.0:1 for sources with emission of less than 50 tpy. POC offsets are not required because facility POC emissions are less than 15 tpy. Because both POC and NO_x contribute to the Bay Area Basin ozone levels, Section 2-302.2 allows the use of POC emission reduction credits for NO_x emissions, at the 1.0:1 offset ratio. As discussed below, the SFERP is proposing to provide NO_x offsets at a ratio of 1.19:1. The excess NO_x ERCs will be used to mitigate the POC emissions from the project, for which offsets are not required.

Section 2-303 requires offsets for emissions increases at facilities that emit more than 100 tpy of SO_2 and PM_{10}. As facility emissions of SO_2 and PM_{10} will be below 100 tpy, offsets are not required for these pollutants. As shown in Table 8.1-31, the maximum SO_2 and PM_{10} impacts from the proposed project are well below the significance thresholds so are not considered significant, and no mitigation is necessary under District rules. Nonetheless, the City will develop a PM_{10} mitigation plan.

Sections 2-304 and 2-305 impose emissions offset requirements, or require project denial, if SO_2, NO_2, PM_{10}, or CO air quality modeling results indicate emissions will interfere with the

[4] Although the turbines will be equipped with oxidation catalysts, no POC control effectiveness has been assumed.

attainment or maintenance of the applicable ambient air quality standards or will exceed PSD increments. As discussed above, District regulations do not require the SFERP to conduct these analyses, since the facility is not subject to PSD review and is not a major source. However, modeling for these pollutants has been conducted to satisfy CEC requirements. The modeling analyses show that facility emissions will not interfere with the attainment or maintenance of the applicable air quality standards.

Emissions offset requirements for NO_x and POC are shown in Table 8.1-32 below. Sufficient offsets are available for purchase, through the District offset emissions bank, and through sources that have not banked emissions with the District, such as facility closures. The District offset bank listing provides the required information for offset identification and assessment of the emission reduction levels achieved. The information includes:

- Ownership of emission offset sources; and
- Emission reduction credits granted by the District that the District has determined meets its requirements for bankable offsets.

TABLE 8.1-32
Facility Offset Requirements

Pollutant	Net Increase in Emissions (tpy)	Required Offset Ratio	Offsets Required (tpy)	Offsets to be Provided (tpy)	Effective Offset Ratio
NO_x	39.8	1.0:1	39.8	TBD	1.19:1
POC	7.7	n/a	0	TBD	n/a
Total (NO_x + POC)	47.5	n/a	39.8	47.5	1.0:1
Total ERCs Available in SF (NO_x + POC)	–	–	–	460.938[a]	–

TBD To be determined

[a] Total ERCs Available in SF from Table 8.1F-1, Appendix 8.1F

A current listing of deposits in the offset bank is included in Appendix 8.1F. The applicant has issued a request for proposals to ERC holders to obtain sufficient ERCs to meet the offset requirements for this project. The applicant has committed to make reasonable efforts to obtain offsets locally. Table 8.1F-1 shows the ERCs that are available within San Francisco and demonstrates that there are sufficient ERCs from local sources to provide the offsets needed for the project.

As discussed in AFC Subsection 8.1.4, Regulatory Setting, the BAAQMD PSD program requirements apply on a pollutant-specific basis to:

- A new major facility that will emit 100 tpy or more, or a major modification to an existing major facility.
- A facility that emits 100 tpy or more, with net emissions increases since the applicable PSD baseline date that exceed the modeling threshold levels shown in Table 8.1-33.

TABLE 8.1-33
BAAQMD PSD Requirements Applicable to 100 tpy Fossil-Fuel-Fired Power Plants

Pollutant	PSD Facility Applicability Level	Modeling Threshold Level	Emissions from New Facility	Modeling Required	Applicable District Regulation
NO_x	100 tpy	100 tpy	39.8 tpy	No	2-2-304.2
SO_2	100 tpy	100 tpy	2.7 tpy	No	2-2-304.2
PM_{10}*	100 tpy	100 tpy	18.2 tpy	No	2-2-304.3
CO	100 tpy	100 tpy	27.9 tpy	No	2-2-305.1
POC	100 tpy	not required	7.7 tpy	–	–

* All particulate matter from the combustion turbines is assumed to be emitted as PM_{10}.

The SFERP will not be a major source. Therefore, it is not subject to the USEPA and District PSD regulations. The District modeling threshold requirements and their applicability to the proposed project are shown in Table 8.1-33.

Rule 2-2-308 requires applicants to demonstrate that emissions from a project located within 10 km (6.2 miles) of a Class I area will not cause or contribute to the exceedance of any national ambient air quality standard or any applicable Class I PSD increment. Because the nearest Class I areas, Point Reyes National Seashore and Pinnacles National Park, are farther than 10 km from the SFERP, this section is not applicable to the proposed facility.

Rule 2-2-306 is also not applicable to the SFERP. This section requires modeling analyses for specific noncriteria pollutants (lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds) if they are emitted in significant quantities and if the facility emits more than 100 tons per year of any criteria pollutant. As the project is not a major source and will not emit significant quantities of the specific noncriteria pollutants, a noncriteria pollutant modeling analysis under this section is not required. However, a screening health risk assessment has been conducted for potential emissions of toxic air contaminants. The analysis methodology and results are discussed in Subsection 8.1.5.4.

Rule 2-2-418 requires the use of Good Engineering Practices (GEP) stack height. Conformance with the GEP stack height requirement was demonstrated in the modeling analysis conducted for the proposed project.

Regulation 2, Rule 6, Major Facility Review (Title V permit program), applies to major facilities and phase II acid rain facilities. Although the project is not a major facility, it is a phase II acid rain facility. Under the Title V permit program, the SFERP will be required to file an application for an operating permit within 12 months of facility startup. The Phase II acid rain requirements will also apply to the SFERP. As a Phase II Acid Rain facility, the SFERP will be required to provide sufficient allowances for every ton of SO_2 emitted during a calendar year. The SFERP will obtain the necessary allowances on the current open trade market. The SFERP will also be required to install and operate continuous monitoring systems; District enforcement of its rules will ensure installation of these systems.

The general prohibitory rules of the District applicable to the proposed project and the determination of compliance follow.

Regulation 1-301 addresses Public Nuisance. The new facility will emit insignificant quantities of odorous or visible substances; therefore, the project will comply with this regulation.

Regulation 6 pertains to particulate matter and visible emissions. Any visible emissions from the project will not be darker than No. 1 when compared to a Ringlemann Chart for any period(s) aggregating 3 minutes in any hour. Because the new turbines will burn clean fuels, the opacity standard of not greater than 20 percent for a period or periods aggregating 3 minutes in any hour and the particulate emission concentrations limit of 0.15 grains per standard cubic feet of exhaust gas volume will not be exceeded.

Regulation 7, Odorous Substances, is not applicable to the proposed project. Combustion turbine operations do not result in odor complaints.

Regulation 9, Rule 1, Sulfur Dioxide, specifies an emission standard of less than 300 ppm SO_2. Because of the insignificant quantities of sulfur in natural gas, this limit will be achieved. In addition, the ambient air quality modeling analysis discussed in Subsection 8.1.5.3.1 shows that ground-level concentrations of SO_2 from the proposed project will not result in ground-level concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours.

Regulation 9, Rule 2, pertains to hydrogen sulfide. The combustion turbines are not expected to emit H_2S.

Regulation 9, Rule 3, Nitrogen Oxides From Heat Transfer Operations, imposes a NO_x limit of 125 ppm. The proposed project will easily comply with this rule.

Regulation 9, Rule 9, limits the emissions of nitrogen oxides from combustion turbines during baseload operations to less than 9 ppmv corrected to 15 percent O_2. The proposed NO_x level of 2.5 ppmvd, corrected to 15 percent O_2, will satisfy the requirements of this rule. In addition, the continuous emission monitoring (CEM) system that the SFERP will install will also satisfy the monitoring and recordkeeping requirements of this rule.

District Regulation 10 (40 CFR 60 Subpart GG) adopts by reference the federal New Source Performance Standards (NSPS) for stationary gas turbines. This regulation requires monitoring of fuel; imposes limits on the emissions of NO_x, SO_2, and PM_{10}; and requires source testing of stack emissions, process monitoring, and data collection and recordkeeping. All of the BACT limits imposed on the new turbines will be more stringent than the requirements of the NSPS emission limits. Monitoring and recordkeeping requirements for BACT will be more stringent than the requirements in this rule. The SFERP will comply with the NSPS regulations.

8.1.6.4 Consistency with San Francisco Board of Supervisors Ordinance No. 124-01 and Resolution No. 827-02

In May 2001, the San Francisco Board of Supervisors adopted Ordinance No. 124-01. This ordinance adopts minimum requirements for the protection of human health and the environment for any proposed new electric generation at the Potrero Power Plant. The ordinance calls for the Board to work with the SFPUC and the Department of the Environment (ENV) to adopt a new Electricity Resource Plan for San Francisco. The

project's conformance with Ordinance No. 124-01 is discussed in Section 4 on environmental justice.

8.1.7 Cumulative Air Quality Impacts Analysis

An analysis of potential cumulative air quality impacts that may result from the proposed combustion turbines and other reasonably foreseeable projects is generally required only when project impacts are significant.

To ensure that potential cumulative impacts of the SFERP and other nearby projects are adequately considered, a cumulative impacts analysis will be conducted in accordance with the protocol included as Appendix 8.1G.

8.1.8 Mitigation

Mitigation will be provided for all emissions increases from the project in the form of offsets and the installation of BACT, as required under District regulations. For PM_{10}, applicant is working with the community to develop a mitigation proposal.

8.1.9 References

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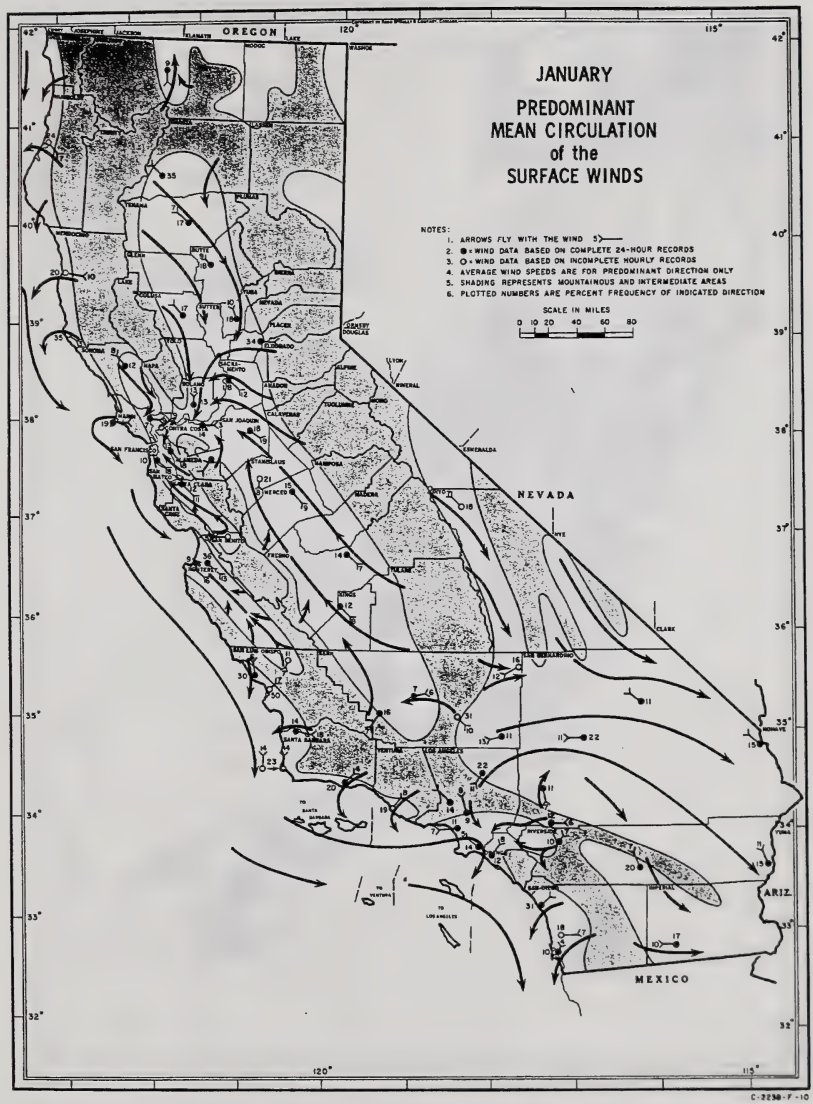


FIGURE 8.1-1
January Predominant Mean Circulation of the Surface Winds

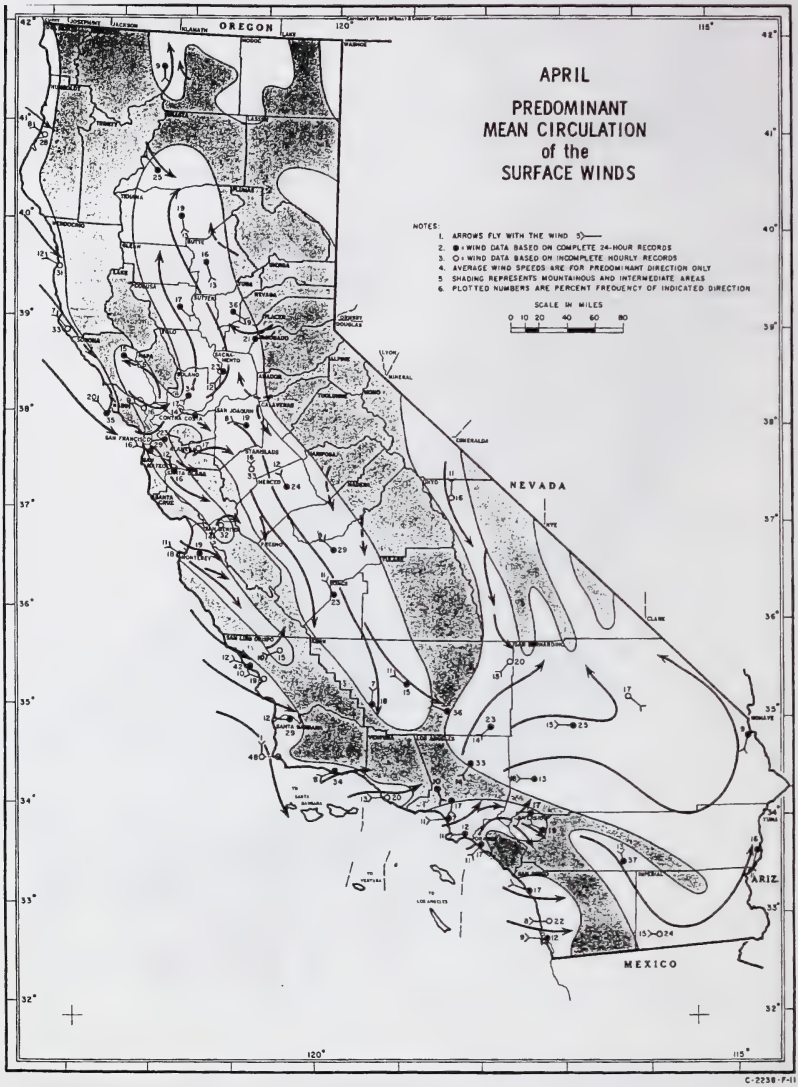


FIGURE 8.1-2
April Predominant Mean Circulation of the Surface Winds

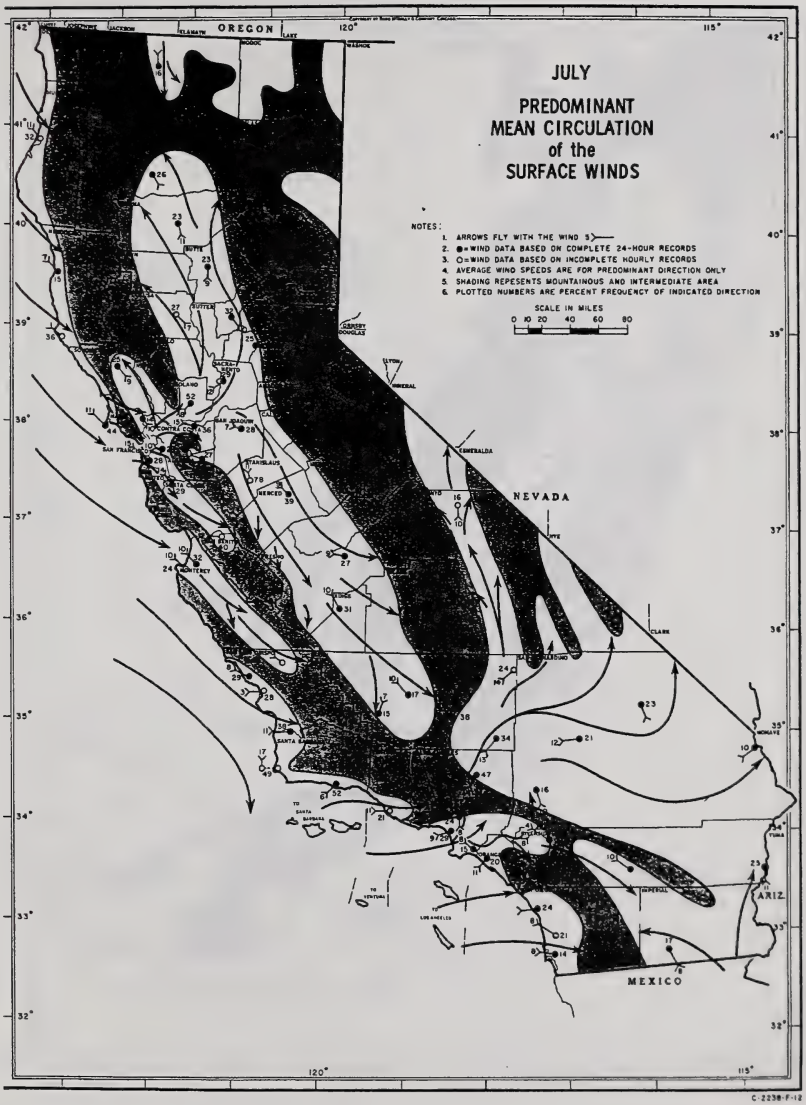


FIGURE 8.1-3
July Predominant Mean Circulation of the Surface Winds

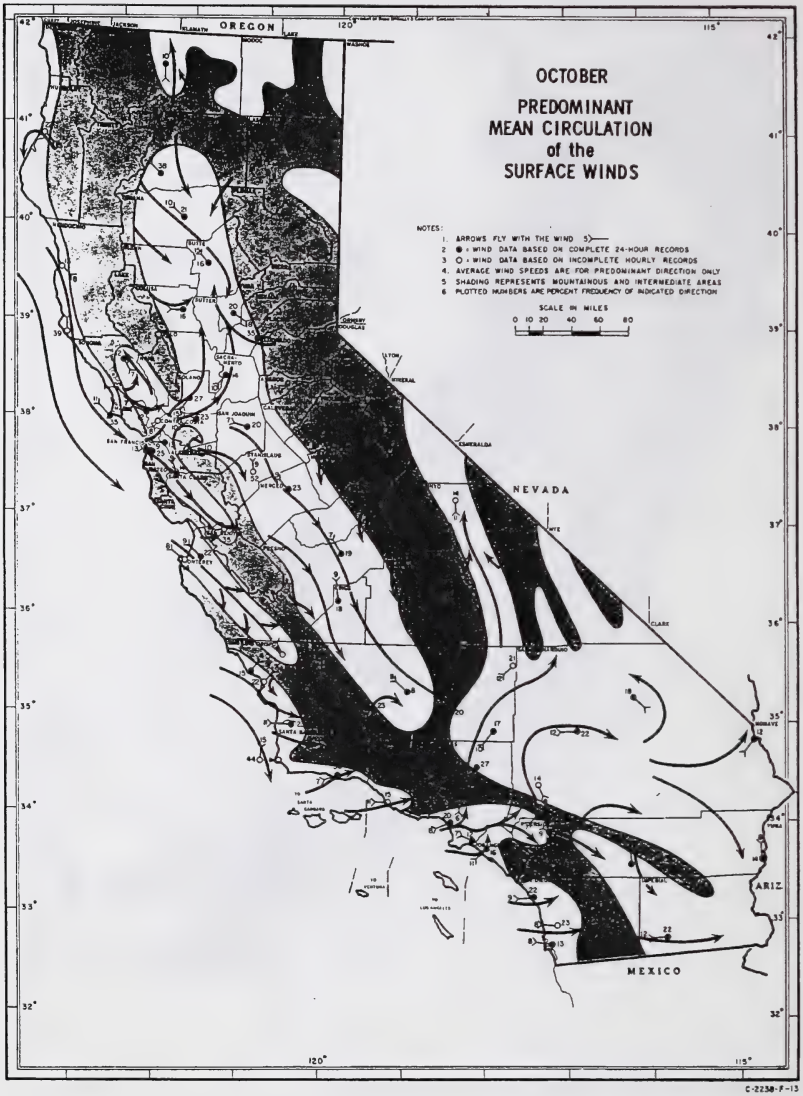


FIGURE 8.1-4
October Predominant Mean Circulation of the Surface Winds

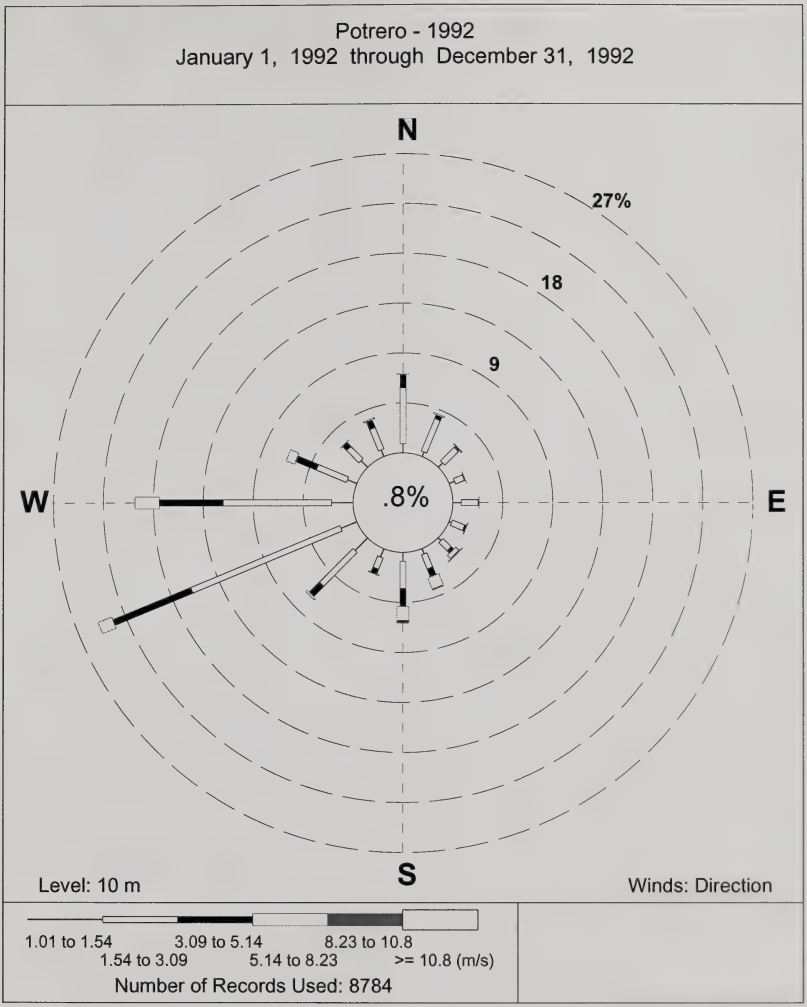


FIGURE 8.1-5A
Annual Wind Rose 1992

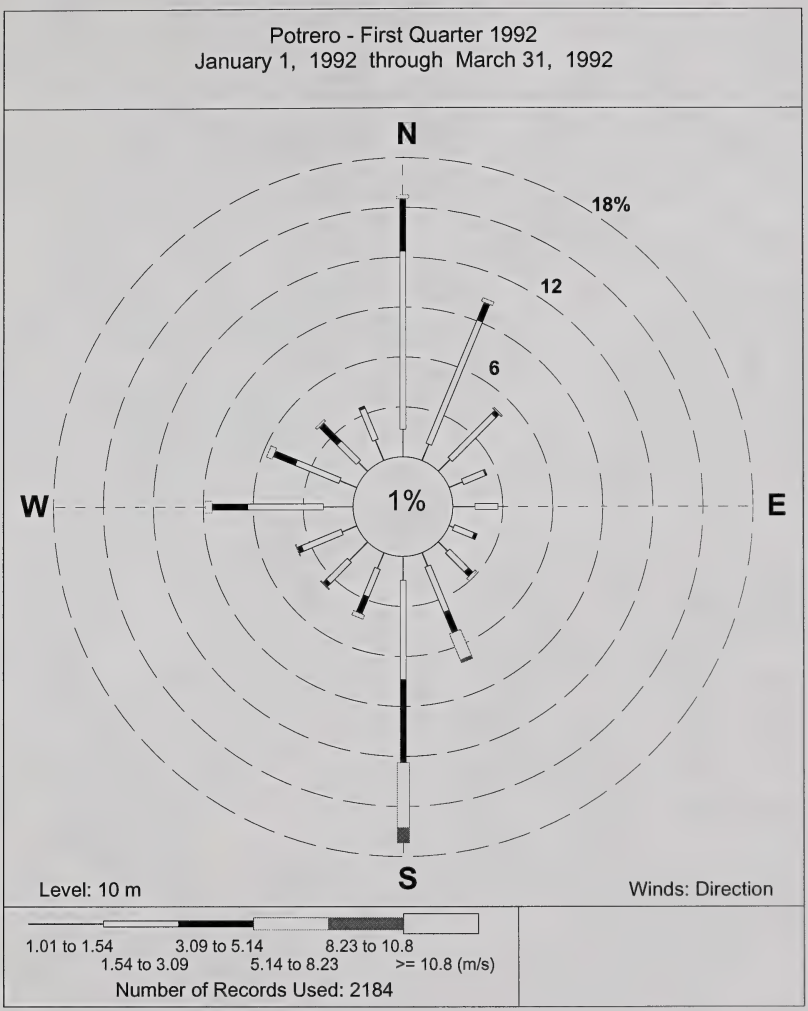


FIGURE 8.1-5B
Quarterly Wind Rose
First Quarter 1992

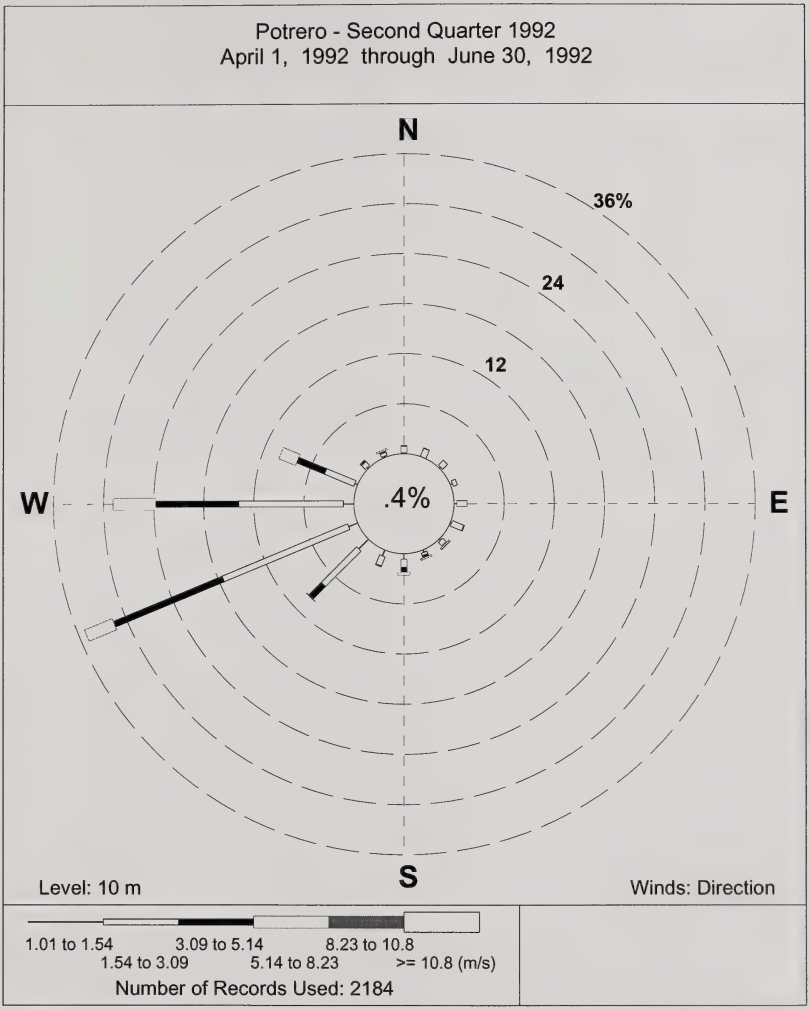


FIGURE 8.1-5C
Quarterly Wind Rose
Second Quarter 1992

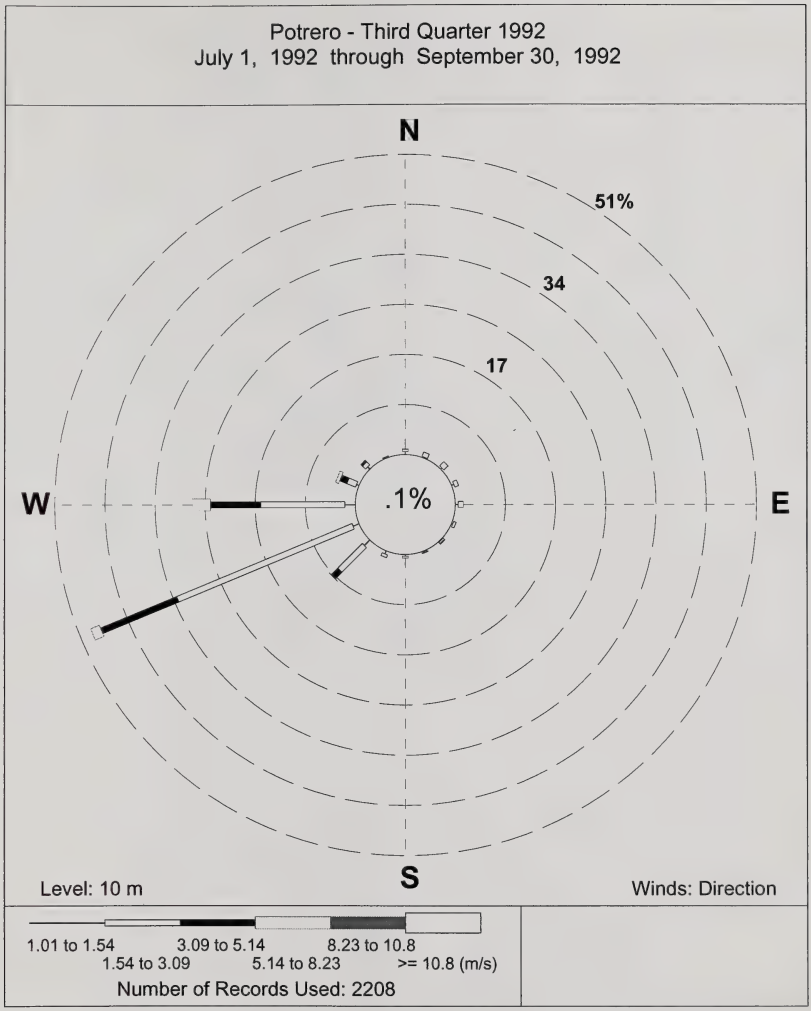


FIGURE 8.1-5D
Quarterly Wind Rose
Third Quarter 1992

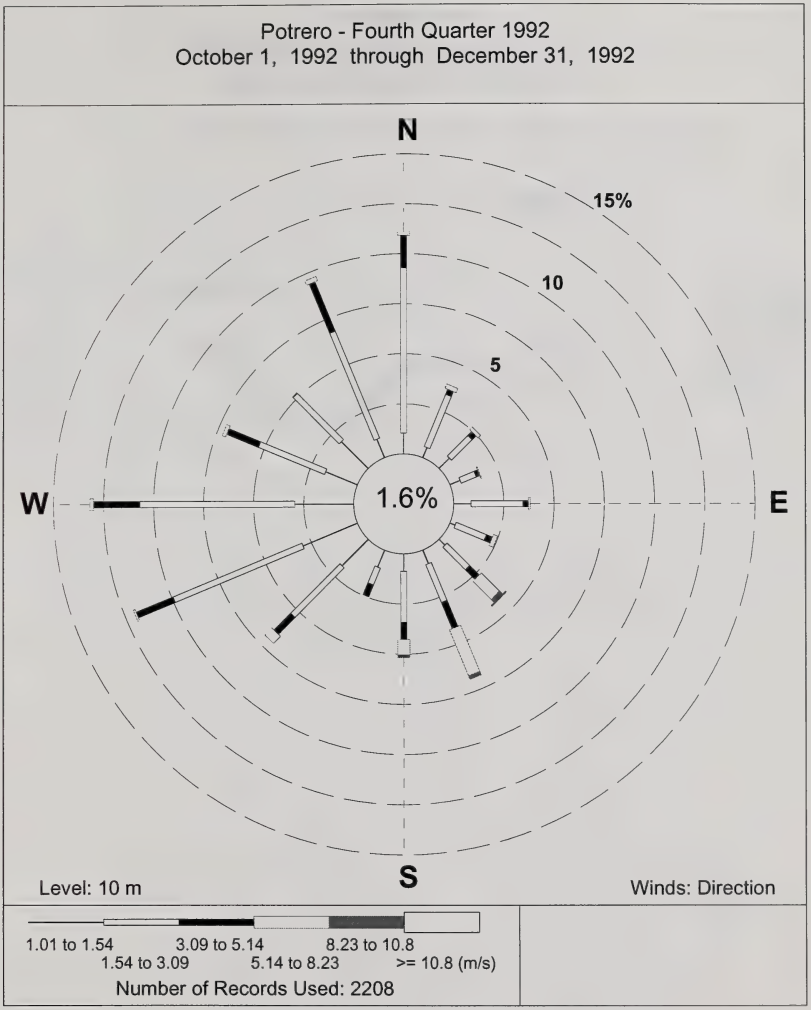


FIGURE 8.1-5E
Quarterly Wind Rose
Fourth Quarter 1992

Figure 8.1-6
Maximum Hourly Ozone Levels
San Francisco, 1991-2002

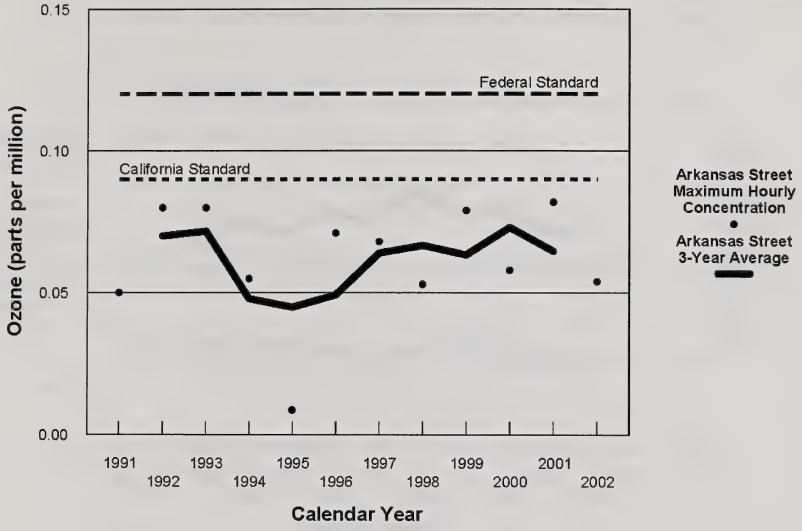


Figure 8.1-7
Maximum 8-Hour Ozone Levels
San Francisco, 1991-2002

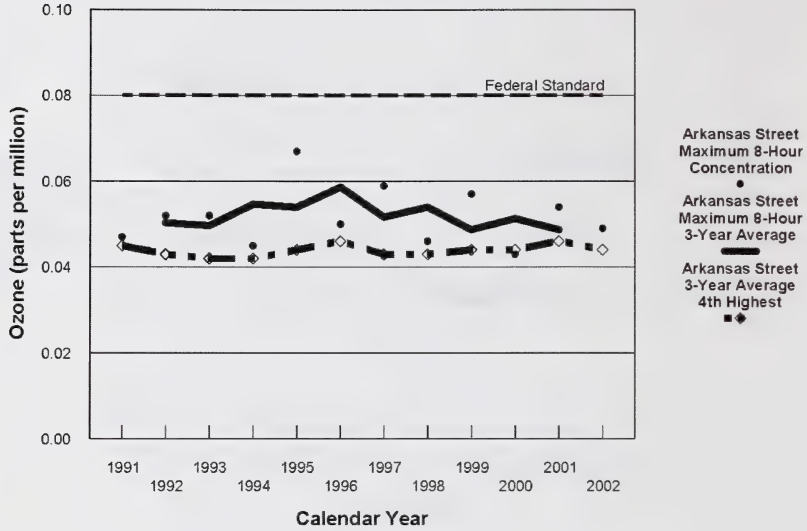


Figure 8.1-8
Maximum Hourly NO2 Levels
San Francisco, 1991-2002

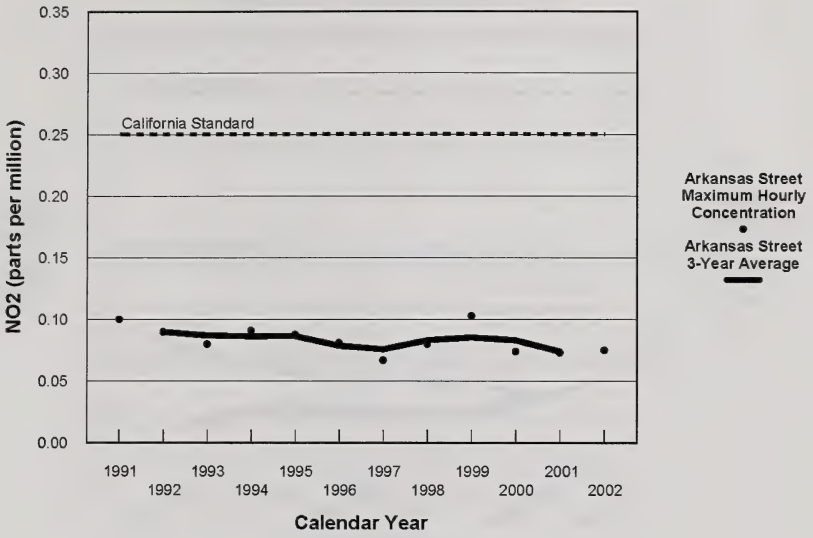


Figure 8.1-9

Maximum 1-Hour Average CO Levels
San Francisco, 1991-2002

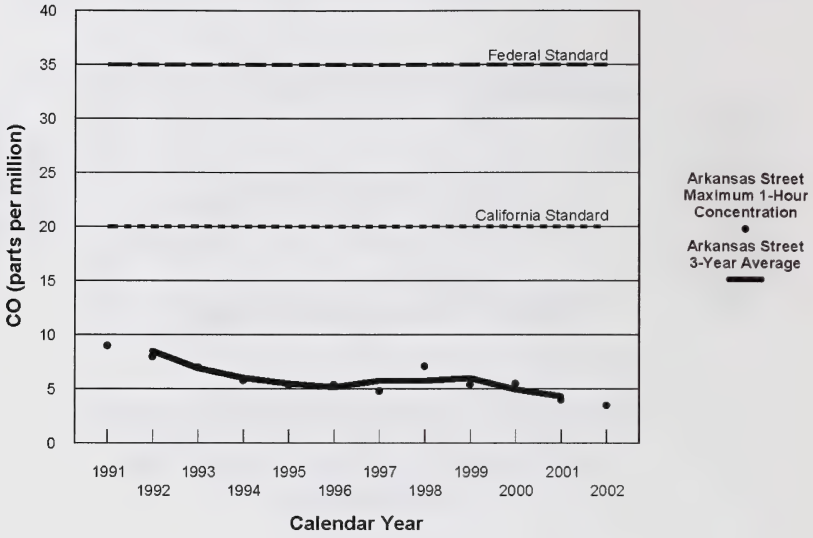


Figure 8.1-10

Maximum 8-Hour Average CO Levels
San Francisco, 1991-2002

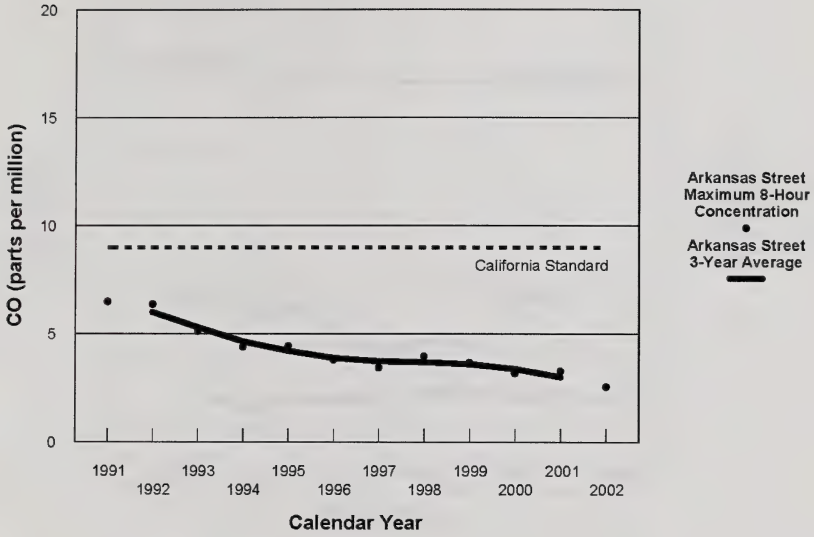


Figure 8.1-11

Maximum 1-Hour SO2 Levels
San Francisco, 1993-2002

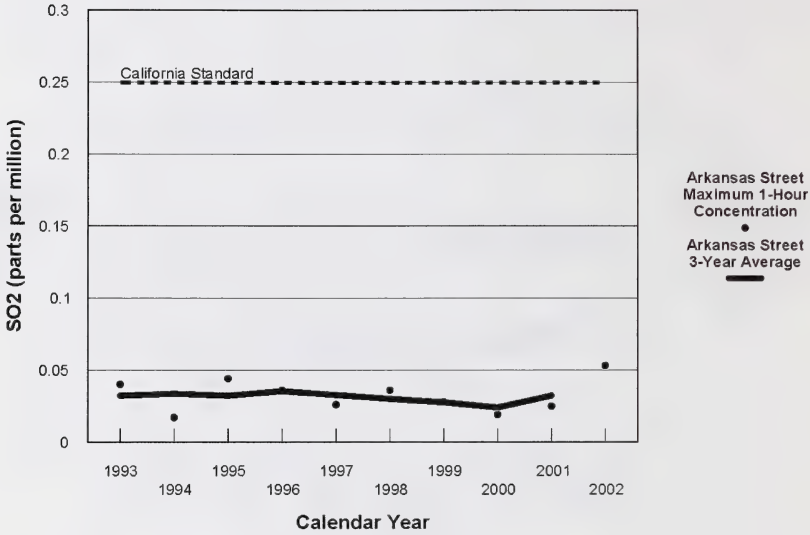


Figure 8.1-12
Maximum 24-Hour Average Sulfate Levels
San Francisco, 1991-2002

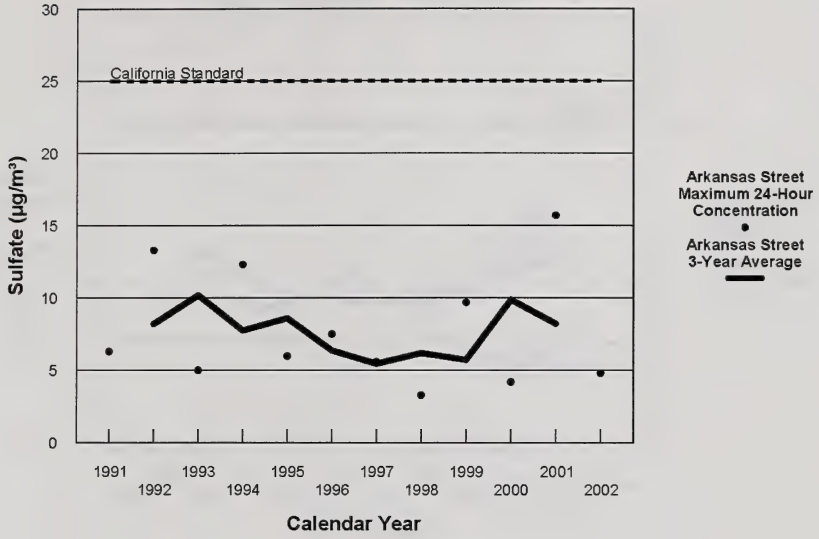


Figure 8.1-13

Maximum 24-Hour Average PM10 Levels San Franciso, 1991-2002

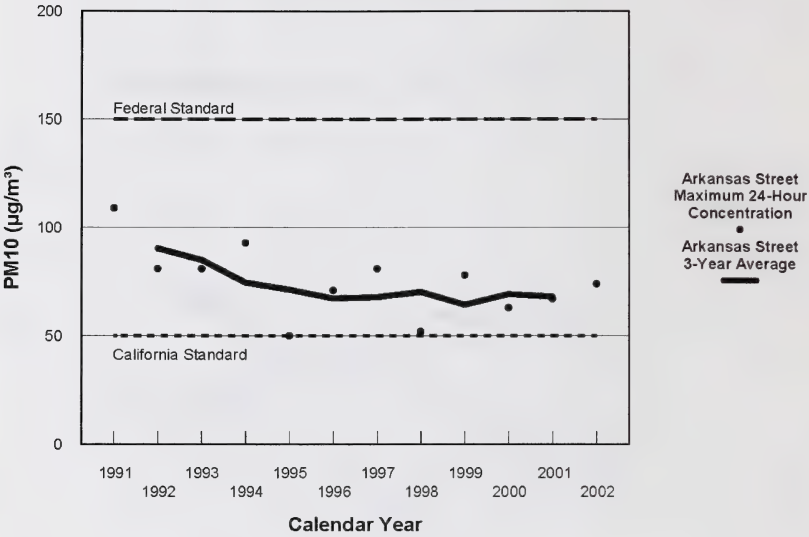


Figure 8.1-14

Expected Violations of the California 24-Hour PM10 Standard (50 µg/m³) San Francisco, 1991-2002

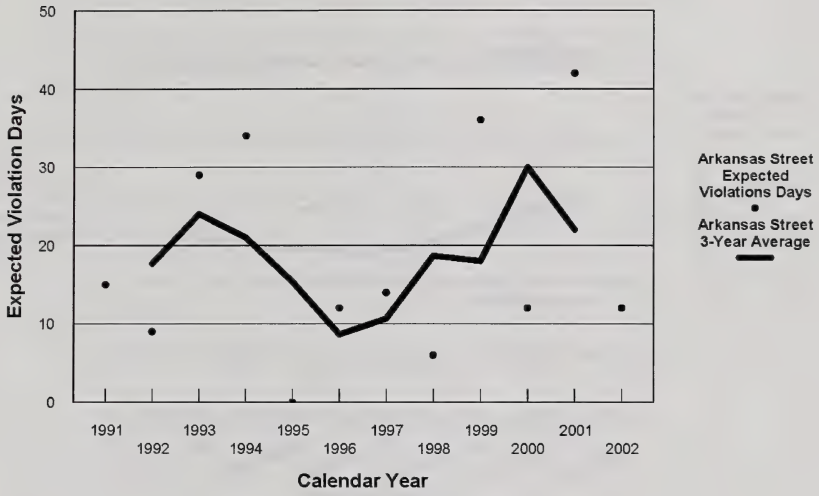


Figure 8.1-15

Annual Average PM10 Levels
San Francisco, 1991-2002

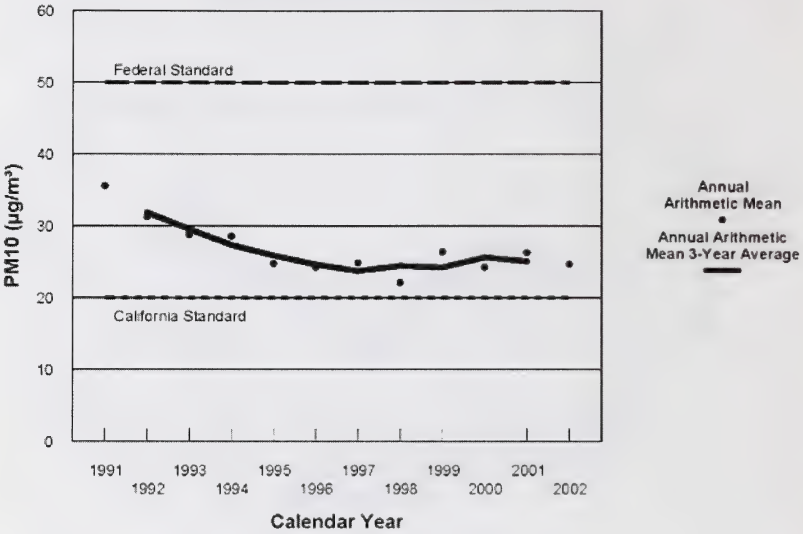
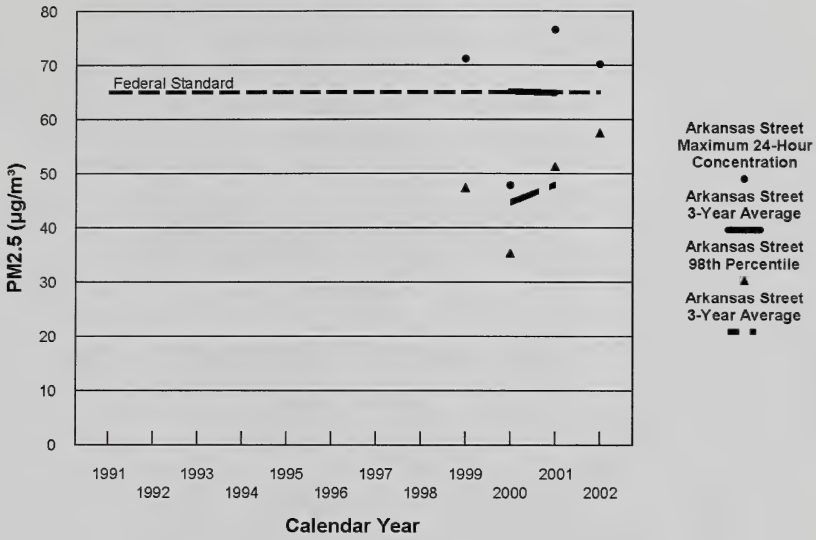


Figure 8.1-16

Maximum & 98th Percentile 24-Hour PM2.5 Levels San Francisco, 1991-2002



SUBSECTION 8.2

Biological Resources

8.2 Biological Resources

8.2.1 Introduction

This subsection describes the laws, ordinances, regulations, and standards (LORS) that apply to biological resource protection, the environmental setting and conditions of the affected site, the methods that were used to evaluate the potential presence of special-status species, and the potential adverse impacts on biological resources that could occur as a result of project construction and operation. It also presents protection and mitigation measures that would avoid, minimize, or compensate for adverse impacts.

8.2.2 Applicable Laws, Ordinances, Regulations, and Standards

The following subsections describe the primary LORS that apply to potential impacts on biological resources in the project area, and list the agencies responsible for enforcing the regulations. A summary of the LORS is provided in Table 8.2-1, at the end of this section.

8.2.2.1 Federal

Federal Endangered Species Act (FESA, 16 United States Code [USC] 153 et seq.). Applicants for projects that could result in adverse impacts on any federally listed species are required to consult with and mitigate potential impacts in consultation with the U.S. Fish and Wildlife Service (USFWS). Adverse impacts are defined as "take," which is prohibited except through authorization of a Section 7 or Section 10 consultation and Incidental Take Authorization. "Take" under federal definition includes "such act as may include significant habitat modification or degradation" (50 Code of Federal Regulations [CFR] §17.3). Species that are not listed are not protected by the Federal Endangered Species Act (FESA) even if they are candidates for listing; however, USFWS advises that a candidate species (as well as species of concern) could be elevated to listed status at any time, and therefore, applicants should regard these species with special consideration.

Migratory Bird Treaty Act (16 USC 703 to 711) protects all migratory birds, including nests and eggs.

Bald and Golden Eagle Protection Act (16 USC 668) specifically protects bald and golden eagles from harm or trade in parts of these species.

8.2.2.2 State

California Endangered Species Act (Fish and Game Code Section 2050 et seq.). Species listed under this act cannot be "taken" or harmed, except under specific permit. At present, "take" means to do or attempt to do the following: hunt, pursue, catch, capture, or kill.

Fish and Game Code Section 3511 describes bird species, primarily raptors, that are "fully protected." Fully protected birds may not be taken or possessed, except under specific permit requirements.

Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.

Fish and Game Code Section 3503.5 protects all birds of prey and their eggs and nests.

Fish and Game Code Section 3513 makes it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

Fish and Game Code Sections 4700, 5050, and 5515 lists mammal, amphibian, and reptile species that are fully protected in California.

Fish and Game Code Sections 1900 et seq., the Native Plant Protection Act lists threatened, endangered, and rare plants listed by the state.

Title 14, California Code of Regulations, Sections 670.2 and 670.5 lists animals designated as threatened or endangered in California. California species of special concern (CSC) is a category conferred by the California Department of Fish and Game (CDFG) on those species that are indicators of regional habitat changes or are considered potential future protected species. CSCs do not have any special legal status, but are intended by CDFG for use as a management tool to take these species into special consideration when decisions are made concerning the future of any land parcel.

California Fish and Game Code (Sections 1601 through 1607) prohibits alteration of any stream, including intermittent and seasonal channels and many artificial channels, without a permit from CDFG. CDFG jurisdiction is limited to areas within the 100-year floodplain. Within this zone, CDFG jurisdiction is subject to the judgement of the department. This applies to any channel modifications that would be required to meet drainage, transportation, or flood control objectives of a project.

California Environmental Quality Act (CEQA) (Public Resources Code Section 15380) defines "rare" in a broader sense than the definitions of threatened, endangered, or species of special concern. Under this definition, CDFG can request additional consideration of species not otherwise protected. CEQA requires that the effects of a project on environmental resources must be analyzed and assessed using criteria determined by the lead agency.

Warren Alquist Act (Public Resources Code Section 25000, et seq.) is a CEQA-equivalent process implemented by the California Energy Commission (CEC). Preparation of this application will result in an assessment prepared by the CEC staff to fulfill the requirements of CEQA.

8.2.2.3 Local and Other Jurisdictions

8.2.2.3.1 Applicable Habitat Conservation Plans and Critical Habitat Designations. The project is not located in or under the jurisdiction of an existing Habitat Conservation Plan.

Although the proposed project disturbance areas do not fall within any designated or proposed critical habitat areas, it is located in the general vicinity of Critical Habitat designated under the FESA for:

- Central Valley fall/late fall-run chinook salmon ESU (*Oncorhynchus tshawytscha*)
- Central California coast coho salmon ESU (*Oncorhynchus kisutch*)
- Winter run chinook salmon ESU (*Oncorhynchus tshawytscha*)
- Steller (northern) sea lion (*Eumetopias jubatus*)

(Note: An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon or steelhead.)

The designated Critical Habitats for the above three salmon species are associated with aquatic resources, while local sea lion Critical Habitat is limited to offshore island rookeries. No project features or construction access would affect any aquatic or shore habitats.

8.2.2.3.2 San Francisco General Plan. The Environmental Protection Element of the San Francisco General Plan (San Francisco County, 1995) contains objectives to protect air (see Subsection 8.1) and water quality (see Subsection 8.14) and ensure sensible management of natural resources as well as conservation and restoration of open space (see Subsection 8.9) that have benefits to biological resources. It also contains specific policies and goals for protecting areas of sensitive plant and wildlife habitat and for assuring compatibility between natural areas and development. Environmental protection policies applicable to the project are summarized in Table 8.2-1.

8.2.2.3.3 Sustainability Plan for San Francisco. The San Francisco Sustainability Plan includes objectives to limit loss of biodiversity as well as goals to create a sustainable economy while contributing minimal impact on the natural world (City and County of San Francisco, 1997). Objectives applicable to the project are summarized in Table 8.2-1.

8.2.2.3.4 San Mateo County General Plan. The Vegetative, Water, Fish, and Wildlife Resources Policies chapter of the San Mateo County General Plan (San Mateo County, 1986) contains specific policies and goals for protecting areas of sensitive plant and wildlife habitat and for assuring compatibility between natural areas and development. The policies of this plan are included based on the potential for air emission impacts on serpentine habitat within San Mateo County's San Bruno Mountain State and County Park. Environmental protection policies applicable to the project are summarized in Table 8.2-1.

8.2.3 Environmental Setting

The following subsections describe the biological conditions of the proposed San Francisco Electric Reliability Project (SFERP) site, beginning with a regional overview, the vegetation types and habitat present in the project area, a description of wildlife typical to the area, and a discussion of specific special-status species known to occur in the general region (see Figure 8.2-1 for documented species locations). Figures are located at the end of the subsection.

8.2.3.1 Regional Overview

The proposed SFERP site is located adjacent to the western shore of central San Francisco Bay in the Potrero District of San Francisco (see Figures 8.2-1 and 8.2-2).

The San Francisco Bay is a breach in the Coast Range that extends for much of the length of the state. The Bay is an important geologic break in the range, providing an influential climatic and hydrological connection between the Pacific Ocean and the Central Valley. The San Francisco area abounds with environmental diversity as land meets water and salt water meets fresh water. The result is a collection of communities such as deep open water, sandy shorelines, dunes, oak woodlands, grasslands, scrub, salt flats, salt marshes, estuaries,

brackish marshes, freshwater marshes, and riparian corridors. The range of habitats and transition zones between, result in a diverse assemblage of plant and wildlife species.

San Francisco itself is approximately a 7-mile square peninsula defining the northern end of the south Coast Range. It is urban with dense industrial, commercial, and residential development. However, it is not without undeveloped or abandoned lots, parkland, and other patches of designated open space providing important habitat for common and special-status plant and wildlife species. Even in the urban landscape, many species have adapted and continue to persist in the presence of human disturbance and significant habitat modification.

The SFERP site is located in a heavily industrialized area of San Francisco. The project location was formerly owned and occupied by a now decommissioned Pacific Gas and Electric (PG&E) steam electric plant. The existing Potrero Power Plant (Potrero PP) lies immediately to the east between the project and the Bay. Industrial and commercial land uses are immediately adjacent to north, west, and south boundaries of the site. Aquatic habitats of the Bay are approximately 750 feet east of the site. The associated SFERP transmission line and switchyard will be contained within the site and the gas and water lines will involve local connections with existing infrastructure.

Significant biological resources in the project vicinity include the San Francisco Bay, Heron's Head Park, and San Bruno Mountain (see Figures 8.2-1 and 8.2-2). The San Francisco Bay is an inlet where the inland waters from the Sacramento and San Joaquin rivers meet the Pacific Ocean. The Bay provides important habitat for fishes, migratory birds, and wetland plant and wildlife species. Heron's Head Park is located approximately 1.5 miles southwest of the project adjacent to the Hunter's Point power plant. The 24-acre park is a restored wetland situated on top of a landfill. San Bruno Mountain is located approximately 4.5 miles southwest of the project in San Mateo County, east of Daly City. The mountain encompasses a state and county park and its biological resources are the subject of the San Bruno Mountain Habitat Conservation Plan. Islais Creek empties into the Bay approximately 3,000 feet south of the project. It is one of the few creeks located in San Francisco. It once emptied into a large marsh at its mouth but has been channelized and severely modified with riprap. Figure 8.2-2 includes project feature locations and biological resources identified on aerial photos at 1:13,200 scale.

The ocean influence and varied topography surrounding San Francisco result in a variety of microclimates. The geographical break in the Coastal Range channels wind through the Bay and influences climate east through the Central Valley and up the Sierra Nevada Range. San Francisco experiences a typical Californian Mediterranean climate, modified by its ocean proximity. True to the Mediterranean climate, winters are characteristically mild (45 to 60 degrees Fahrenheit [°F]) and moist. However, wind patterns and cold ocean water combine to produce fog and moderate summer temperatures (50°F to 70°F).

The following subsections describe the types of habitat found in the project impact areas. Special-status species that are known or have the potential to occur in the project impact areas are listed in Table 8.2-2 (located at the end of Subsection 8.2) and described in Subsection 8.2.3.3. A comprehensive list of special-status species obtained from USFWS, CDFG, and the CEC's Final Staff Assessment (FSA) for the proposed Potrero PP Unit 7

(PPPU7) (CEC, 2002) that was used to evaluate project impacts to sensitive biological resources is included in Appendix 8.2A.

8.2.3.2 Habitat and Vegetation Communities

The SFERP site is located entirely within a previous industrial development and is paved with both concrete and asphalt. There are no remaining features that provide natural habitat for plant and wildlife species. Vegetation is primarily limited to nonnative invasive species that have become established in small patches of bare ground and cracks within the pavement. The existing patches of vegetation provide limited forage and cover resources for a limited diversity of wildlife such as common passerines and rodents. Nearby abandoned buildings may also provide habitat for adaptive species such as common barn owls (*Tyto alba*). The project site is separated from the Bay by other industrial facilities including the existing Potrero PP (see Figure 8.2-2). San Francisco Bay is the closest area of significant habitat to the SFERP site. The Bay shore has been significantly modified with piers, bulkheads, and stabilizing structures. The waterfront is developed for shipping and commercial uses.

8.2.3.3 Special-Status Species

A list of federal and state special-status plant and wildlife species was compiled for the project area based upon the following references: the CDFG California Natural Diversity Data Base (CNDDB); California Native Plant Society's (CNPS) Electronic Inventory; a USFWS species list requested for San Francisco County; the Potrero PP FSA; and a field reconnaissance survey. The reference information is based on known occurrences, historical records, or the presence of suitable habitat for any given life stage of a particular species. The known locations of special-status species identified in the CNDDB records for the associated San Francisco North U.S. Geological Survey (USGS) quadrangle are shown on Figure 8.2-1. The field reconnaissance survey was performed by a CH2M HILL biologist on November 19, 2003, and included a 1-mile radius around the site. Based on the project setting, it was determined that focused or additional surveys would not be necessary. The qualifications of the field biologist are provided in Appendix 8.2B.

The reference search and survey resulted in the comprehensive special-status species list provided in Appendix 8.2A. The list includes species listed as threatened or endangered that have special requirements under the FESA and California Endangered Species Acts (CESA) and other unlisted special-status species that could become listed in the future. The table includes the habitat types that could support these species as well as the potential for occurrence in the project area.

Results from the reconnaissance survey, habitat evaluations, aerial photographs, and the PPPU7 FSA conclude an absence of significant biological resources in the SFERP project area. There are no property or project features that would support special-status plants or attract special-status wildlife. Potential impacts were limited to avian collision with the transmission line and exhaust stacks. This impact would be a function of plant operation rather than construction.

The San Francisco Bay area includes sensitive serpentine habitats that are adversely impacted by significant levels of NO_x deposition. Due to prevailing winds, SFERP operation

is not expected to contribute significant oxides of nitrogen (NO_x) deposition on surrounding serpentine habitats such as those found on San Bruno Mountain.

Therefore, the initial species list was shortened to include only those species that may be affected by these two potential impact sources. The abbreviated list is presented in Table 8.2-2.

8.2.3.3.1 Special-Status Plants. Information acquired from the CNDDB, CNPS, and other sources resulted in a list of 33 special-status plants species that could occur in San Francisco County (Appendix 8.2A). Most of these species are associated with natural habitats that were once prevalent in San Francisco but have since been lost to extensive urban development. Vegetation in the project area is limited to invasive species established in patches of disturbed ground and foundation cracks. Therefore, project construction will not result in direct removal of special-status plant species. No trees are located on the site.

The greatest potential for impact to plants would be from nitrogen deposition due to NO_x emissions during facility operation. Nitrogen functions as a vegetation fertilizer when added to grassland and woodland communities such as are found on San Bruno Mountain. Those San Bruno Mountain habitats on serpentine rock are characteristically nutrient deficient and support relatively low plant species diversity. Those plants that are adapted to withstand serpentine soils are often rare and endemic. The addition of nitrogen could promote plant species that otherwise find serpentine habitat inhospitable. This potentially results in increased competition and loss of habitat for more serpentine habitat-dependent plant species. However, due to prevailing winds, SFERP operation is not expected to contribute significant NO_x deposition on surrounding serpentine habitats such as those found on San Bruno Mountain.

The initial special-status plant species list was shortened to eight species based on their association with serpentine habitat (Table 8.2-2). This includes shrubs such as the Presidio manzanita (*Arctostaphylos hookeri* ssp. *franciscana*) and annual herbs such as San Francisco owl's clover (*Orthocarpus floribundus*).

8.2.3.3.2 Special-Status Wildlife. Information acquired from the CNDDB, USFWS, and other sources resulted in a list of 79 special-status wildlife species whose occurrence has been previously recorded in San Francisco County (Appendix 8.2A). Due to the lack of suitable habitats, it is unlikely that any of these species would be found in the project area. Impacts to aquatic resources and the species associated with those habitats were the primary concern for the proposed PPPU7. Unlike that project, the SFERP water supply does not include direct intake or discharge of San Francisco Bay water. SFERP water will be supplied and discharged by conventional City of San Francisco infrastructure. The project site presents no significant resources to attract terrestrial wildlife. Therefore, the initial species list was abbreviated to include only those species that may be affected by nitrogen deposition and avian collision.

Five special-status insects depend on nectar sources associated with serpentine habitats such as those on San Bruno Mountain. Those species include San Bruno elfin butterfly (*Incisalia mossii bayensis*), mission blue butterfly (*Icaricia icarioides missionensis*), callippe silverspot butterfly (*Speyeria callippe callippe*), Bay Checkerspot butterfly (*Euphydryas editha bayensis*), and Opler's longhorn moth (*Adela oplerella*). However, due to prevailing winds, SFERP operation

is not expected to contribute significant NO_x deposition on surrounding serpentine habitats such as those found on San Bruno Mountain.

Exhaust stacks and transmission lines represent collision potential for various bird species. Thirty bird species were included in the abbreviated special-status species list. These species may risk collision when migrating through the general area or when traveling between resource areas. These include raptors such as Cooper's hawk (*Accipiter cooperii*) and American peregrine falcon (*Falco peregrinus anatum*); coastal birds such as California brown pelican (*Pelecanus occidentalis californicus*) and double-crested cormorant (*Phalacrocorax auritus*); and passerines such as rufus hummingbird (*Selasphorus rufus*) and saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*).

8.2.3.4 Biological Surveys

A biological reconnaissance survey of the project area and general vicinity was performed by a biologist from CH2M HILL on November 19, 2003. The surveyor's qualifications are provided in Appendix 8.2B. The field surveys were aided by aerial photographs, which helped identify land uses. The presence, or potential presence, of sensitive biological resources was determined from information gathered during field surveys conducted for the project, published and unpublished literature, and natural resource agency databases. The survey included the site and an area within a 1-mile radius from the site (see Figure 8.2-2). Results from 1999 and 2000 surveys performed for the proposed PPPU7 were also used for reference (Mirant, 2000). No further biological surveys are considered necessary.

8.2.4 Environmental Consequences

Potential direct and indirect impacts to biological resources were evaluated to determine the permanent and temporary effects of the construction, operation, maintenance, and decommissioning of the SFERP project and supporting facilities. A summary of potential project impacts is presented in Table 8.2-3.

8.2.4.1 Standards of Significance

Impacts on biological resources are considered significant if one or more of the following conditions could result from implementation of the proposed project:

- Substantial effect, reduction in numbers, restricted range, or loss of habitat for a population of a state or federally listed threatened or endangered species.
- Substantial effect, reduction in numbers, restricted range, or loss of habitat for a population of special-status species, including fully protected, candidate proposed for listing, CSC, and certain CNPS list designations.
- Substantial interference with the movement of any resident or migratory fish or wildlife species.
- Substantial reduction of habitat for native fish, wildlife, or plants.
- Substantial disturbance of wetlands, marshes, riparian woodlands, and other wildlife habitat.
- Removal of trees designated as heritage or significant under County or local ordinances.

8.2.4.2 Potential Impacts of Construction and Operation of SFERP Project Site and Temporary Construction Laydown Area

The SFERP plant site would permanently occupy 4.5 acres of existing paved industrial development. This area is currently characterized by paved and cement surfaces with patches of exposed fill supporting ruderal vegetation. The project site was once occupied by a series of industrial uses; it is adjacent to the operating Potrero PP; and is the subject of the previously proposed PPPU7 AFC. The site provides little habitat value for native plant and wildlife species. The construction laydown area will be approximately 10 acres, located on land leased from the Port of San Francisco. The laydown area would be located southeast of the project site, between 25th and Cesar Chavez streets and between Water Front and Georgia streets (see Figure 1-2). This proposed laydown area has been recently graded and partially graveled.

8.2.4.2.1 Special-Status Species. No special-status plant or wildlife species were observed on the proposed project site and vicinity during the 2003 reconnaissance survey for this project, or the 1999 and 2000 surveys performed for the proposed PPPU7 (Mirant, 2000). No records of historical special-status species sightings were included in the CNDDB for the area. CNDDB records for three special-status plant species (adobe sanicle, alkali milk-vetch, and San Francisco owl's-clover) are located less than a mile west of the site (Figure 8.2-1). All three records are over 100 years old and the species are now considered locally extirpated. The site and laydown areas are dominated by industrial development and do not support likely habitat for any special-status plant or wildlife species. Seasonal botanical and wildlife surveys are not necessary.

Due to the lack of biological resources, SFERP's construction would not result in significant impacts to special-status plant and wildlife species. The following paragraphs describe the potential for impacts associated with different components of SFERP site construction and operation.

8.2.4.2.2 Wetlands and Waters of the U.S. No jurisdictional wetlands or waters are present on the project site. Project construction would not cause loss or fill of any wetlands.

Cooling water discharged from the plant cooling system will be sent to the Southeast Water Pollution Control Plant (SEWPCP) via the City 's combined sewer system. Likewise, stormwater runoff from the site will be sent to the SEWPCP via the combined sewer system.

Water will be applied to the site for dust control during construction. Erosion and sediment washed into surface waters would be potentially harmful to San Francisco Bay water quality. As discussed further in Subsections 8.9 (Agriculture and Soils) and 8.14 (Water Resources), the Applicant will prepare an erosion and sediment control plan that specifies best management practices (BMPs) to avoid sediment runoff and erosion that would cause water quality degradation.

8.2.4.2.3 Cooling Tower Drift. Cooling tower drift is the fine mist of water droplets that escape the cooling tower's mist eliminators and are emitted into the atmosphere. Cooling towers concentrate the particulates (total dissolved solids) during the cooling process and produce a salt mist. At high concentrations, salts can physically damage leaf cells, which affects the photosynthetic ability of the plant. Other effects include blocking the stomata (leaf pores) so

that normal gas exchange is impaired, as well as affecting leaf adsorption and solar radiation reflectance. These effects can reduce productivity in crops, trees, and sensitive special-status plant species in a deposition area.

Studies performed by Lerman and Darley (1975) concluded that particulate deposition rates of 365 grams per square meter per year (g/m^2/year) caused damage to fir trees, but rates of 274 g/m^2/year and 400 to 600 g/m^2/year did not cause damage to vegetation at other sites. Pahwa and Shipley (1979) exposed vegetation (corn, tobacco, and soybeans) to varying salt deposition rates to simulate drift from cooling towers that use saltwater (20,000 to 25,000 parts per million [ppm]) in the circulation water. Salt stress symptoms on the most sensitive crop plants (soybeans) were barely perceptible effects at a deposition rate of 2.98 g/m^2/year (Pawha and Shipley, 1979).

Assuming a particulate deposition rate of 2 centimeters per second and a maximum salt concentration of 0.10 micrograms per cubic meter ($\mu g/m^3$) (the maximum modeled annual average particulate matter concentrate from the cooling tower), the maximum expected deposition rate is 3.091 kg/hectare/year or 0.309 g/m^2/year, which is significantly less than levels expected to cause barely perceptible effects to the most sensitive crop plants.

8.2.4.2.4 Cooling Effluent and Discharge. Process water for the SFERP power plant operations will be supplied from the City's combined sewage system and go through a new onsite water treatment plant. This system is further discussed in Section 7 (Water Supply) and Subsection 8.2.4.3. Water will be discharged to the plant wastewater sump, and then to the City's combined sewer system. Since the SFERP project will draw process water from, and discharge wastewater into, the combined sewer system, there will be no mechanism to affect fish or other aquatic biota from securing or discharging water during operations.

8.2.4.2.5 Combustion Turbine Emissions. Air emissions from the three combustion turbine exhaust stacks include nitrogen oxides (NO_x), sulfur oxides (SO_x), and particulates (PM_{10}). Nitrogen oxide gases (NO, NO_2) convert to nitrate particulates in a form that is suitable for uptake by most plants. As stated previously, increased nitrate availability could potentially impact the natural serpentine vegetation community on San Bruno Mountain. The nonnative annuals could out-compete the native serpentine plants. However, prevailing wind patterns in the area would drive the plume inland across the Bay and away from San Bruno Mountain. Therefore, NO_x deposition impacts to serpentine habitat would be insignificant.

Nitrogen dioxide is potentially phytotoxic, but generally at exposures considerably higher than those resulting from most industrial emissions. Exposures for several weeks at concentrations of 280 to 490 $\mu g/m^3$ can cause decreases in dry weight and leaf area. One-hour exposures of at least 18,000 $\mu g/m^3$ are required to cause leaf damage. The predicted maximum annual average NO_2 of 0.1 $\mu g/m^3$ are far below these threshold limits. In addition, the total predicted maximum 1-hour NO_2 concentrations of 8.3 $\mu g/m^3$ (with infrequent concentrations of 115 $\mu g/m^3$ during simultaneous startups of all three combusion turbine generators [CTGs]) would be significantly smaller than the 1-hour threshold (7,500 $\mu g/m^3$ or 3,989 ppm) for 5 percent foliar injury to sensitive vegetation (USEPA, 1979). This indicates that NO_x emissions from the SFERP, when considered in the absence of other air pollutants, would not adversely affect the physical functions of plants in the area.

8.2.4.2.6 Noise and Lights from Plant Operations. The SFERP site is zoned industrial and is surrounded by several industrial facilities adjacent to the site. These facilities typically operate 24 hours per day, 7 days per week and have standard industrial lighting and noise emissions. Operation of the plant would produce some noise, as described in Subsection 8.5. Noise and construction activities would not adversely impact wildlife, due to existing noise levels and the lack of local wildlife attractants in the immediate vicinity.

Bright night lighting could disturb wildlife (e.g., nesting birds, foraging mammals, and flying insects). Night lighting is also suspected to attract migratory birds to some areas and, if the lights are on tall buildings or the combustion turbine exhaust stacks, collisions could occur. However, the exhaust stack height of 85 feet is lower in profile than much of the surrounding development. In comparison, stack heights for the Protrero PP's Unit 3 is about 300 feet. As described in Subsection 8.11, Visual Resources, any required stack and facility lighting will be pointed down to minimize impacts.

8.2.4.2.7 Potential for Collision and Electrocution Hazard to Birds. The project would construct three 85-foot-high exhaust stacks and electric transmission lines that could potentially result in bird collisions. Most collisions involve nocturnal migrants flying at night in inclement weather and low-visibility conditions, colliding with tall guyed television or radio transmission towers (CEC, 1995; Kerlinger, 2000 in Final Staff Assessment for Contra Costa Power Plant). Migratory birds generally fly at an altitude that would avoid ground structures, except when crossing over topographic features (e.g., ridge tops) or when inclement weather forces them down closer to the ground. A large number of birds migrate along the Pacific Coast, passing through the San Francisco Bay Area. The project area is within a known path for nocturnally migrating birds. However, there are no topographic or ecological features that would attract birds to this location or "funnel" them into the vicinity of exhaust stacks or other elevated features of the project. Bird collisions with the new 300-foot-long 115-kilovolt (kV) electrical transmission connections are expected to be rare due to relatively low pole heights (approximately 40 to 50 feet). Because of the relatively low structure height and lack of guy wires, the potential for bird collisions with stacks, poles, electric conductor wires, structures, and towers of the project is considered less than significant.

Large raptors, herons, and egrets can be electrocuted by transmission lines when a bird's wings simultaneously contact two conductors of different phases, or a conductor and a ground. The installation of transmission lines and poles will be constructed according to "raptor-friendly" guidelines (Avian Power Line Interaction Committee [APLIC, 1996]). The 115-kV electrical transmission lines for the project will be constructed with at least a 5.5-foot span between conductor wires. The additional 300 feet of transmission conductors between the plant and the adjacent substation would not increase avian electrocutions in the area.

8.2.4.3 Impacts of Natural Gas and Water Pipeline Construction and Operation

Fuel will be delivered to SFERP via a new pipeline, to PG&E's San Francisco Load Center located approximately 250 feet west of the project site. The primary method of pipeline construction includes excavation of an open trench approximately 4-feet deep and 3- to 7-feet wide, depending on site-specific soil type. The construction corridor will be approximately 50-feet wide. The pipeline corridor will require pavement and concrete cuts and does not intersect sensitive environmental resources. The temporary construction

corridor will be used to store the excavated soil, provide access for equipment and vehicles, and space for welding the pipeline prior to installation and backfill.

The project will use recycled water for the majority of its water needs. The system will include a new water treatment facility to be constructed in a pre-engineered building on the SRERP site. A pipeline will be constructed to divert effluent from the City's combined sewer system collection station near Marin Street (see Figure 2-1). The pipeline will be approximately 1-mile long and the primary method of construction includes locating new piping within and existing underground structure (collection box) and approximately 3,300 feet of open trench excavation (approximately 4-feet deep and 3- to 7-feet wide, depending on site-specific soil types) for the remaining pipeline. The construction corridor will be approximately 25- to 75-feet wide. The pipeline corridor will require pavement and concrete cuts and does not intersect sensitive environmental resources. The temporary construction corridor will be used to store the excavated soil, provide access for equipment and vehicles, and space for handling the pipeline prior to installation and backfill.

Potable water will be supplied by a City main located adjacent to the project boundary at Illinois and 23rd streets. There are no significant habitats present that would be adversely affected by temporary construction of the gas or water lines. Therefore, construction is not likely to result in any impacts to biological resources.

8.2.4.3.1 Special-Status Species. Construction of the gas and water pipelines will be confined to road cuts in an industrial area. The work area is adjacent to industrial and commercial development, which are not characterized by natural habitat and do not provide significant biological resources for special-status plant and wildlife species.

8.2.4.3.2 Wetlands and Waters. The gas and water pipelines will not cross any jurisdictional wetlands or navigable water features.

The pipelines will require pressure testing after construction to ensure welds are tight and to remove any accumulated dust or welding residue from the pipeline. To do this, the pipe is filled with water and pressurized, resulting in a potentially large volume of water. If disposed improperly this water could cause adverse effects on the water quality of receiving waters. The City proposes to dispose of pipe-testing water in the combined sewer system. Disposal to the sewer would ensure impacts of wastewater disposal are less than significant.

8.2.4.5 Conflict with Regional Habitat Conservation Plans

There are no countywide or regional Habitat Conservation Plans that would affect development in this industrial area of San Francisco. As discussed earlier, nitrogen deposition from NO_x emissions are not expected to result in significant impacts within sensitive habitats covered by the San Bruno Mountain Habitat Conservation Plan.

8.2.4.6 Cumulative Impacts

The proposed project is located within a previously developed area surrounded by similar industrial development. The associated linear facilities will be short in length and will be located within previously developed areas. NO_x emissions have been projected to be insignificant and are not expected to impact local natural habitat or increase cumulative impacts in the area. Because the project is not expected to result in significant impacts and

there are no other proposed projects in the study area that would have similar impacts on biological resources, therefore, the SFERP project is not expected to contribute to any adverse cumulative impacts.

Operation of the completed facility should support the closure of the Hunter's Point Power Plant (Hunter's Point PP), which is adjacent to Heron's Head Park and the Bay. PG&E has an agreement with CCSF to decommission Hunter's Point PP when the plant is no longer needed for electric system reliability. The California Independent System Operator (CAISO), which is responsible for the reliability of the electric system in much of California, has stated in writing that construction of the SFERP project along with a number of transmission projects would allow for closure of Hunter's Point PP without an adverse impact on reliability. Thus, construction of the SFERP would support the shutdown of an outdated and less efficient facility. It is not certain whether the closure of Hunter's Point PP will provide any overall NO_x reduction. However, since prevailing winds are away from San Bruno Mountain, impacts on serpentine habitat would not be affected. Hunter's Point PP also takes cooling water directly from the Bay, resulting in the potential impingement of fish, aquatic invertebrates, and other aquatic species. This impact would be eliminated.

8.2.5 Proposed Mitigation and Monitoring

The construction and operation of the SFERP project is not expected to result in significant biological impacts; therefore, no biological monitoring is proposed and mitigation measures are limited to the following design guidelines intended to minimize avian impacts.

8.2.5.1 Foraging and Migratory Birds

The project site and transmission line route was chosen to minimize the crossing of open areas potentially used as forage by migratory birds and raptors. The proposed mitigation measures include:

1. Design "raptor-friendly" 115-kV electric transmission lines, as described in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC 1996) with conductor wire spacing greater than the wingspans of large birds (43 inches on the vertical and 60 inches on the diagonal) to prevent electrocutions.
2. Provide safety lighting that points downward on the turbine exhaust stacks to reduce avian collisions, if such lighting is required.

8.2.6 Involved Agencies and Agency Contacts

Because the project has no federal nexus, will not impact any state or federal listed species or state species of concern and will not cross any streams, no agency contacts are provided.

8.2.7 Required Permits and Permit Schedule

Because no streams will be crossed, no federal, state, or local permits are required for Biological Resources.

8.2.8 References

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TABLE 8.2-1
Applicable Conservation Policies

Element	Goal/Policy	Conformance
Federal		
Federal Endangered Species Act (FESA, 16 USC 153)	Applicants for projects that could result in adverse impacts on any federally listed species are required to consult with and mitigate potential impacts in consultation with the U.S. Fish and Wildlife Service (USFWS).	The SFERP site does not include habitat for federally listed species. Construction and operation will avoid significant impacts to federally listed species and their habitat.
Migratory Bird Treaty Act (16 USC 703 to 711)	Protects all migratory birds, including nests and eggs.	The SFERP site does not include habitat or other features that would likely attract migratory birds. Stacks and new transmission lines will be low in profile relative to other nearby structures and are not likely to result in significant bird strikes. New transmission lines will be constructed using "raptor-friendly" design guidelines.
Bald and Golden Eagle Protection Act (16 USC 668)	Specifically protects bald and golden eagles from harm or trade in parts of these species.	The SFERP site does not include habitat or other features that would likely attract eagles. Stacks and new transmission lines will be low in profile relative to other nearby structures and are not likely to result in significant bird strikes. New transmission lines will be constructed using "raptor-friendly" design guidelines.
State		
California Endangered Species Act (Fish and Game Code Section 2050 et seq.).	Species listed under this act cannot be "taken" or harmed, except under specific permit.	The SFERP site was analyzed and it was determined that SFERP construction or operation will not affect listed species and, therefore, not result in "take."

TABLE 8.2-1
Applicable Conservation Policies

Element	Goal/Policy	Conformance
Fish and Game Code Section 3511	Describes bird species, primarily raptors, that are "fully protected." Fully protected birds may not be taken or possessed, except under specific permit requirements.	SFERP construction or operation will not result in "take." Stacks and new transmission lines will be low in profile relative to other nearby structures and are not likely to result in significant bird strikes. New transmission lines will be constructed using "raptor-friendly" design guidelines.
Fish and Game Code Section 3503	States that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.	The SFERP site was analyzed and does not include features that would encourage or accommodate nest building. Any encountered nests would be avoided during the species' breeding season.
Fish and Game Code Section 3503.5	Protects all birds of prey and their eggs and nests.	The SFERP site was analyzed and does not include habitat or other features that would likely attract birds of prey. Stacks and new transmission lines will be low in profile relative to other nearby structures and are not likely to result in significant bird strikes. New transmission lines will be constructed using "raptor-friendly" design guidelines. The SFERP site was analyzed and does not include features that would encourage or accommodate nest building.
Fish and Game Code Section 3513	Makes it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.	SFERP construction or operation will not result in "take" of birds of prey, their nests, or eggs. Site features have been designed to avoid avian strikes. The SFERP site does not include features that would encourage or accommodate nest building.
Fish and Game Code Sections 4700, 5050, and 5515	Lists mammal, amphibian, and reptile species that are fully protected in California.	The SFERP site was analyzed and does not include likely habitat for fully protected mammal, amphibian, or reptile species.

TABLE 8.2-1
Applicable Conservation Policies

Element	Goal/Policy	Conformance
Fish and Game Code Sections 1900 et seq.,	The Native Plant Protection Act lists threatened, endangered, and rare plants listed by the state.	The SFERP site was analyzed and does not include likely habitat for protected plant species.
Title 14, California Code of Regulations, Sections 670.2 and 670.5	Lists animals designated as threatened or endangered in California.	The SFERP site was analyzed and does not include likely habitat for state-listed species.
California Fish and Game Code (Sections 1601 through 1607)	Prohibits alteration of any stream, including intermittent and seasonal channels and many artificial channels, without a permit from CDFG.	The SFERP site construction was analyzed and will not include alteration of any stream or channel.
California Environmental Quality Act (CEQA) (Public Resources Code Section 15380)	CEQA requires that the effects of a project on environmental resources must be analyzed and assessed using criteria determined by the lead agency.	The Application for Certification (AFC) analysis and process is CEQA equivalent. All requirements under CEQA are met with the analysis in the SFERP AFC.
Warren Alquist Act (Public Resources Code Section 25000, et seq.)	Warren-Alquist Act is a CEQA-equivalent process implemented by the California Energy Commission (CEC).	The AFC analysis and process is CEQA-equivalent. All requirements under the Warren-Alquist Act are met with the analysis in the SFERP AFC.
Local and Other Jurisdictions		
City and County of San Francisco General Plan		
Environmental Protection	Objective 1 Achieve proper balance among the conservation, utilization, and development of San Francisco's natural resources.	SFERP is located and designed to avoid impacts to biological resources.
Environmental Protection	Policy 1.1 Conserve and protect the natural resources of San Francisco. The City and County must assure that its remaining natural resources are protected from misuse. The use of existing resources should provide maximum benefit for public use while preserving and protecting the natural character of the environment.	SFERP is located and designed to avoid biological resources.
Environmental Protection	Policy 1.2 Improve the quality of natural resources. To prevent contamination of natural resources, the City and County should support and comply with all anti-pollution standards of the region.	An erosion and sediment control plan will be prepared.

TABLE 8.2-1
Applicable Conservation Policies

Element	Goal/Policy	Conformance
Environmental Protection	Policy 1.3 Restore and replenish the supply of natural resources. The City and County should undertake projects to acquire or create open space, cultivate more vegetation, replenish wildlife, and landscape man-made surroundings.	SFERP will not result in the removal of open space or native vegetation.
Environmental Protection	Policy 1.4 Assure that all new development meets strict environmental quality standards and recognizes human needs. Development projects should not disrupt natural or ecological balance, degrade the visual character of natural areas, or otherwise conflict with the objectives and polices of the Master Plan.	SFERP is located and designed to avoid impacts to biological resources.
Environmental Protection	Objective 3 Maintain and improve the quality of the Bay, ocean, and shoreline areas.	SFERP is located and designed to avoid biological resources. It will not use the Bay as a water source as do other local power plants.
Environmental Protection	Policy 3.3 Implement plans to improve sewage treatment and halt pollution of the Bay and ocean.	SFERP will use recycled water and combined sewer drains.
Environmental Protection	Objective 8 Ensure the protection of plant and animal life in the City.	SFERP is located and designed to avoid biological resources.
Environmental Protection	Policy 8.1 Cooperate with and otherwise support the CDFG and its animal protection programs.	SFERP will initiate informal consultation with CDFG, if needed.
Environmental Protection	Policy 8.2 Protect the habitats of known plant and animal species that require a relatively natural environment. Primarily encourages the continued management of established open areas like Golden Gate Park, beaches, the Presidio, and other areas with open space that provide potential natural habitat for plant and wildlife species.	SFERP is located and designed to avoid impacts to biological resources.
Environmental Protection	Policy 8.3 Protect rare and endangered species.	SFERP is located and designed to avoid impacts to biological resources.
Recreation and Open Space	Objective 1 Preserve large areas of open space sufficient to meet long-range needs of the bay region. This primary objective of this element is to preserve and promote the use of open space for recreation. This includes conservation of natural habitat.	SFERP is located and designed to avoid impacts to biological resources. The project will not involve the removal of open space.
Recreation and Open Space	Policy 2.13 Preserve and protect significant natural resource areas. The City and County should make efforts to preserve remaining open spaces that provide habitat for plant and wildlife species.	The project site is not characterized by unique natural features or open space that provides significant habitat for plant or wildlife species.

TABLE 8.2-1
Applicable Conservation Policies

Element	Goal/Policy	Conformance
The Sustainability Plan for the City of San Francisco		
Biodiversity	Goal 2 To protect and restore remnant natural ecosystems	SFERP is located and designed to avoid impacts to biological resources.
Biodiversity	Goal 3 To protect sensitive species and their habitats and support their recovery in San Francisco.	SFERP is located and designed to avoid impacts to biological resources.
Biodiversity	Goal 4 To maximize habitat value in developed and naturalistic areas, both public and private.	Not applicable. Project is in an industrial area.
San Mateo County General Plan		
Vegetative, Water, Fish and Wildlife Resources Policies	Policy 1.2 The County will protect sensitive habitats from reduction in size or degradation of the conditions necessary for their maintenance.	SFERP is located and designed to avoid impacts to biological resources from NO_x.
Vegetative, Water, Fish and Wildlife Resources Policies	Policy 1.23 The County will regulate the location, density and design of development to minimize significant adverse impacts and encourage enhancement of vegetative, water, fish and wildlife resources.	SFERP is located and designed to avoid impacts to biological resources from NO_x.
Vegetative, Water, Fish and Wildlife Resources Policies	Policy 1.26 The County will ensure that development will minimize disruption of fish and wildlife and their habitats.	SFERP is located and designed to avoid impacts to biological resources from NO_x.
Vegetative, Water, Fish and Wildlife Resources Policies	Policy 1.27 The County will regulate land uses and development activities within and adjacent to sensitive habitats in order to protect critical vegetative, water, fish, and wildlife resources; protect rare, endangered, and unique plants and animals from reduction in their range or degradation of their environment; and protect and maintain the biological productivity of important plant and animal habitats.	SFERP is located and designed to avoid impacts to biological resources from NO_x.

Sources: Master Plan for the City and County of San Francisco (1995), The Sustainability Plan for the City of San Francisco (1997), and the San Mateo County General Plan (1986).

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
Plants					
Franciscan manzanita	*Arctostaphylos hookeri* ssp. *franciscana*	FSC, 1A	Coastal scrub (serpentinite).	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Evergreen shrub. Last recorded in 1942. Now only grown in cultivation. NO_x emissions will not impact serpentine habitat.
Presidio manzanita	*Arctostaphylos hookeri* ssp. *ravenii*	FE, CE, 1B	Chaparral, coastal prairie, coastal scrub/serpentine outcrop.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Evergreen shrub. Currently known only from the Presidio area. NO_x emissions will not impact serpentine habitat.
San Francisco gumplant	*Grindelia hirsutula* var. *maritima*	FSC, 1B	Coastal bluff scrub, coastal scrub, valley and foothill grassland/sandy or serpentinite.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Perennial herb. NO_x emissions will not impact serpentine habitat.
Marin western flax	*Hesperolinon congestum*	FT, CT, 1B	Chaparral, valley and foothill grassland/serpentinite.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Annual herb. NO_x emissions will not impact serpentine habitat.
white-rayed pentachaeta	*Pentachaeta bellidiflora*	FE, CE, 1B	Valley and foothill grassland (often on serpentine).	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Annual herb. Currently known from one location near Highway 280. NO_x emissions will not impact serpentine habitat.
adobe sanicle	*Sanicula maritima*	FSC, 1B	Chaparral, coastal prairie, meadows and seeps, valley and foothill grassland/clay, serpentine.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Perennial herb. NO_x emissions will not impact serpentine habitat.
Santa Cruz microseris	*Stebbinsoseris decipiens*	FSC, 1B	Broadleaved upland forest, closed-coned coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grassland/open areas, sometimes on serpentine.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Annual herb. NO_x emissions will not impact serpentine habitat.
San Francisco owl's-clover	*Triphysaria floribunda*	FSC, 1B	Coastal prairie, coastal scrub, valley and foothill grassland/usually serpentine.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Annual herb. NO_x emissions will not impact serpentine habitat.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
Invertebrates					
Bay checkerspot butterfly	*Euphydryas editha bayensis*	FT	serpentine grassland with adult nectar sources and larval host plant (dwarf plantain and owls clover).	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	NO_x emissions will not impact serpentine habitat.
Mission blue butterfly	*Icaricia icarioides missionensis*	FE	Dunes and grassland areas with *Lupinus* host plant.	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	Restricted to 3 metapopulations including San Bruno Mountain in San Mateo County, Twin Peaks in San Francisco, and the vicinity of Skyline College in San Mateo County, California (Natureserve 2003). NO_x emissions will not impact serpentine habitat.
San Bruno elfin butterfly	*Incisalia mossii bayensis*	FE	Wooded canyons with cliffs and rocky outcrops. Stonecrop host plant.	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	Current population restricted to San Bruno Mountain, Milagra Ridge, Montara Mountain, and Whiting Ridge (Natureserve 2003). Power plant emissions can adversely impact serpentine-associated nectar plant species.
callippe silverspot butterfly	*Speyeria callippe callippe*	FE	Dry woodlands, foothill grasslands, and chaparral communities. Violet host plant.	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	Closest metapopulation found on San Bruno Mountain. NO_x emissions will not impact serpentine habitat.
Opler's longhorn moth	*Adela oplerella*	FSC	Serpentine grasslands with its larval food plant, California cream cups.	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	NO_x emissions will not impact serpentine habitat.
Birds					
California brown pelican	*Pelecanus occidentalis californicus*	FE, CE	Coastal, pelagic, and offshore islands. Breeding colonies typically on offshore islands.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
double-crested cormorant	*Phalacrocorax auritus*	CSC	Found along the coast and inland water bodies. Typically nest colonial in trees or rocky areas near water.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
Long-billed curlew	*Numenius americanus*	FSC, CT, MB	Winter habitat is primarily open land near, wetland, and agricultural fields in the Central Valley.	Low. Project area is industrial and has no biological resources to attract wildlife.	Winters in Central Valley. Because of low structure height, potential for bird collisions is less than significant.
bank swallow	*Riparia riparia*	FSC, CT	Typically in riparian areas or near water. Colonial nester in burrows in coastal bluffs, cliffs, and banks.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
California least tern	*Sterna antillarum browni*	FE, CE	Coastal. Nest on sandy beaches and mud flats.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
Bald eagle	*Haliaeetus leucocephalus*	FT, MB	Primary presence in California during winter migration. Associated with a variety of habitats. Nest sites typically found near water.	Low. Project area is industrial and has no biological resources to attract wildlife.	Platform nests in fork of tall tree or ledges. Migration season autumn through late winter. Because of low structure height, potential for bird collisions is less than significant.
Cooper's hawk	*Accipiter cooperii*	CSC	Woodland and otherwise forested areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
western snowy plover	*Charadrius alexandrinus nivosus*	FT, CSC	Coastal. Sandy beaches and mudflats.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
northern harrier	*Circus cyaneus*	CSC	Wetlands, marshes, and open fields.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
white-tailed kite	*Elanus leucurus*	FSC, FP, MB	Abundant in California's Central Valley where it is commonly associated with riparian and open habitats.	Low. Project area is industrial and has no biological resources to attract wildlife.	Typically breed between January and August. Their platform nests are located in trees or shrubs. Primarily a local resident and is known to form communal roosts in the fall and winter. Because of low structure height, potential for bird collisions is less than significant.
saltmarsh common yellowthroat	*Geothlypis trichas sinuosa*	FSC, CSC	Dense marsh and riparian vegetation.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
Loggerhead shrike	*Lanius ludovicianus*	FSC, CSC, MB	Typically associated with open lowland and foothill scrub or riparian woodland habitats with adequate hunting perches.	Low. Project area is industrial and has no biological resources to attract wildlife.	Largely nonmigratory and has been known to defend year-round territories. Nests are typically well-concealed and built in dense shrubs or trees. In California the breeding period typically begins in March and may extend into August. Because of low structure height, potential for bird collisions is less than significant.
Red knot	*Calidris canutus*	FSC	Coastal. Sandy beaches and mudflats.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
Vaux's swift	*Chaetura vauxi*	FSC, CSC	Woodland areas near water. Old growth coniferous and deciduous forest. Cavity nester.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
Black swift	*Cypseloides niger*	FSC, CSC	Woodland and riparian areas near water. Cliff nester, often behind waterfalls.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
Little willow flycatcher	*Empidonax traillii brewsteri*	CE, MB	Associated with dense willow riparian vegetation.	Low. Project area is industrial and has no biological resources to attract wildlife.	Breeding May-September. Because of low structure height, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
American peregrine falcon	*Falco peregrinus anatum*	FD, CE, MB	Typically found along mountain ranges, river valleys, and coast lines. Nests are simple scrapes and often located on cliff ledges or other platform surfaces.	Low. Project area is industrial and has no biological resources to attract wildlife.	The breeding season typically begins in March. Because of low structure height, potential for bird collisions is less than significant.
Black oystercatcher	*Haematopus bachmani*	FSC	Typically found along rocky coasts and island areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Breeding typically begins in the late spring. Because of low structure height, potential for bird collisions is less than significant.
Harlequin duck	*Histrionicus histrionicus*	FSC, CSC	Habitat includes a variety of aquatic areas in the northwestern US and Canada. Typically breeds along mountain streams and lakes. Nonbreeding birds often found offshore.	Low. Project area is industrial and has no biological resources to attract wildlife.	Current distribution is rare in California. Because of low structure height, potential for bird collisions is less than significant.
Marbled godwit	*Limosa fedoa*	FSC	Breeding habitat typically found on the plains of Canada and the northern US. Nonbreeding habitat includes coastal areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Significant migration along the California Coast. Because of low structure height, potential for bird collisions is less than significant.
Lewis' woodpecker	*Melanerpes lewis*	FSC, MB	Associated with open forest and oak woodlands. Found along riparian woodland corridors in Central California.	Low. Project area is industrial and has no biological resources to attract wildlife.	Cavity nester. Breeding season begins in mid-April. Because of low structure height, potential for bird collisions is less than significant.
whimbrel	*Numenius phaeopus*	FSC	Nesting areas found in the tundra areas of the far north. Nonbreeding habitat includes coastal areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Found along the Pacific Coast in the winter. Because of low structure height, potential for bird collisions is less than significant.
Ashy storm-petrel	*Oceanodroma homochroa*	FSC, CSC	Open ocean. Typically nests on islands.	Low. Project area is industrial and has no biological resources to attract wildlife.	The Farallon Islands off of San Francisco are a crucial nesting location. Because of low structure height, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
Black skimmer	*Rynchops niger*	FSC, CSC	Found along coastal areas and sometimes on inland freshwater areas. Primarily nest on protected sandy.	Low. Project area is industrial and has no biological resources to attract wildlife.	Primarily breeds in southern California. Because of low structure height, potential for bird collisions is less than significant.
Rufus hummingbird	*Selasphorus rufus*	FSC, MB	Occur in coniferous forest and riparian woodlands in the Central Valley with nearby nectar sources.	Low. Project area is industrial and has no biological resources to attract wildlife.	Typically breed in California March-July. Build cup nest in trees, shrubs. Because of low structure height, potential for bird collisions is less than significant.
Allen's hummingbird	*Selasphorus sasin*	FSC	Coastal chaparral, brushland, and forests edges.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.
Elegant tern	*Sterna elegans*	FSC, CSC	Found along coastal areas and occasionally on inland lakes. Typically nest on sandy beaches.	Low. Project area is industrial and has no biological resources to attract wildlife.	Currently known to breed in only five sites in southern California and northwestern Mexico. San Francisco is part of the nonbreeding range. Because of low structure height, potential for bird collisions is less than significant.
Tricolored blackbird	*Agelaius tricolor*	CSC, MB	Associated with wetland areas with dense vegetation such as cattails, tule, bulrush. Forage in grassland and agricultural fields.	Low. Project area is industrial and has no biological resources to attract wildlife.	Nest in large colonies. Breeding season is April-July; however has also been reported in October and November. Because of low structure height, potential for bird collisions is less than significant.
Western burrowing owl	*Athene cunicularia hypugaea*	FSC, CSC, MB	Habitats includes open grassland habitat with fossorial mammal burrows, often associated with ground squirrels.	Low. Project area is industrial and has no biological resources to attract wildlife.	Utilize small mammal burrows for cover and natal dens. Breeding season is typically from February through August. Because of low structure height, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
Ferruginous hawk	*Buteo regalis*	FSC, MB	Associated with a variety of habitats but commonly found in open grassland areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Uncommon winter resident in California. Breeding typically from March-July. Use large stick nests in trees. Because of low structure height, potential for bird collisions is less than significant.

SOURCE: California Dept. of Fish and Game, 2003; California Native Plant Society, 2001.

Notes:
[a] Scientific names are based on the following sources: AOU (1983); Jennings (1983); Zeiner et al. (1990a-c).
[b] Status. Status of species relative to the Federal and California State Endangered Species Acts and Fish and Game Code:
Federal Status
FE Federally listed as endangered.
FT Federally listed as threatened.
FPE Proposed endangered.
FPT Proposed threatened.
Candidate for listing as federally endangered or threatened. Proposed rules have not yet been issued because they have been precluded at present by other listing activity.
FD Delisted from Federal threatened or endangered status.
FSC Federal Species of Special Concern. Proposed rules have not yet been issued because they have been precluded at present by other listing activity.
MB Migratory Bird Treaty Act. of 1918. Protects native birds, eggs, and their nests.
California Status
CE State listed as endangered. Species whose continued existence in California is jeopardized.
CT State listed as threatened. Species that although not presently threatened in California with extinction are likely to become endangered in the foreseeable future.
CSC California Department of Fish and Game "Species of Special Concern." Species with declining populations in California.
FP Fully protected against take pursuant to the Fish and Game Code Sections 3503.5, 3511, 4700, 5050, 5515.
Other Status.
CNPS California Native Plant Society Listing (does not apply to wildlife species).
Plants, rare, threatened or endangered in California and elsewhere and are rare throughout their range. According to CNPS, all of the plants constituting List 1B meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection) of the California Department of Fish and Game Code and are eligible for state listing.
[c] Season. Blooming period for plants. Season of use for animals. RES = Resident; SUMR = Summer; WNTR = Winter.
[d] Primary Habitat. Most likely habitat association.

TABLE 8.2-3
Summary of Permanent and Temporary SFERP Project Impacts on Biological Resources During Construction.

Location	Project Work	Construction Zone Size	Time Requirements	Habitat Type	Sensitive Biological Resources	Impacts	
						Temporary	Permanent
Power plant site	Removal of existing structures and grading for footprint construction	4.5 acres	Start 2nd Quarter 2005	Paved	None	None	Development of 4.5 acres of previously developed land and ruderal patches
Construction laydown area	Construct compacted gravel pad or use existing surface	10 acres	Start 2nd Quarter 2005	Gravel	None	10 acres	None
Natural gas pipeline	Open pipeline trench to local tie-in location	A tie-in with the existing PG&E San Francisco Load Center located at the corner of Illinois and 23rd streets. Will require a 250-foot of open trench contained within the plant site and adjacent PG&E substation.	Start 4th Quarter 2005	Paved	None	None	None
Potable water supply line	Open pipeline trench to local tie-in location	A tie-in with an existing city main located at the at the corner of Illinois Street and 23rd Street.	Start 4th Quarter 2005	Paved	None	None	None
Process water supply line	Open pipeline trench and box culvert to local tie-in location	A tie-in with a City combined sewer system to a new treatment plant located within the site.	Start 4th Quarter 2005	Paved	None	None	None
115-kV transmission lines	Transmission tower footings, construction and maintenance	300 feet long; contained within the plant site and adjacent PG&E Substation.	Start 2nd Quarter 2005	Paved	None	None	Because of low structure height, potential for bird collisions is less than significant.

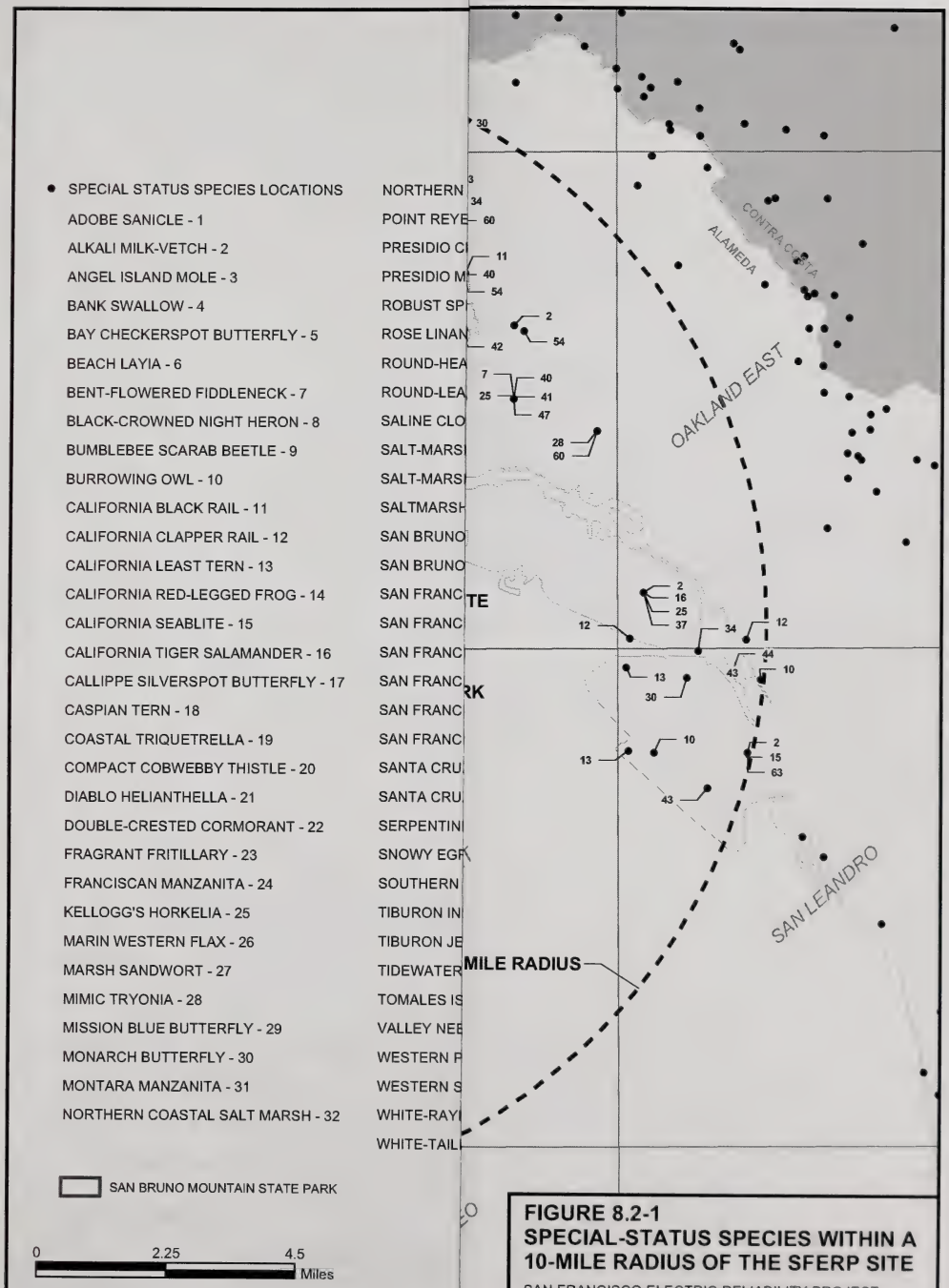


FIGURE 8.2-1
SPECIAL-STATUS SPECIES WITHIN A 10-MILE RADIUS OF THE SFERP SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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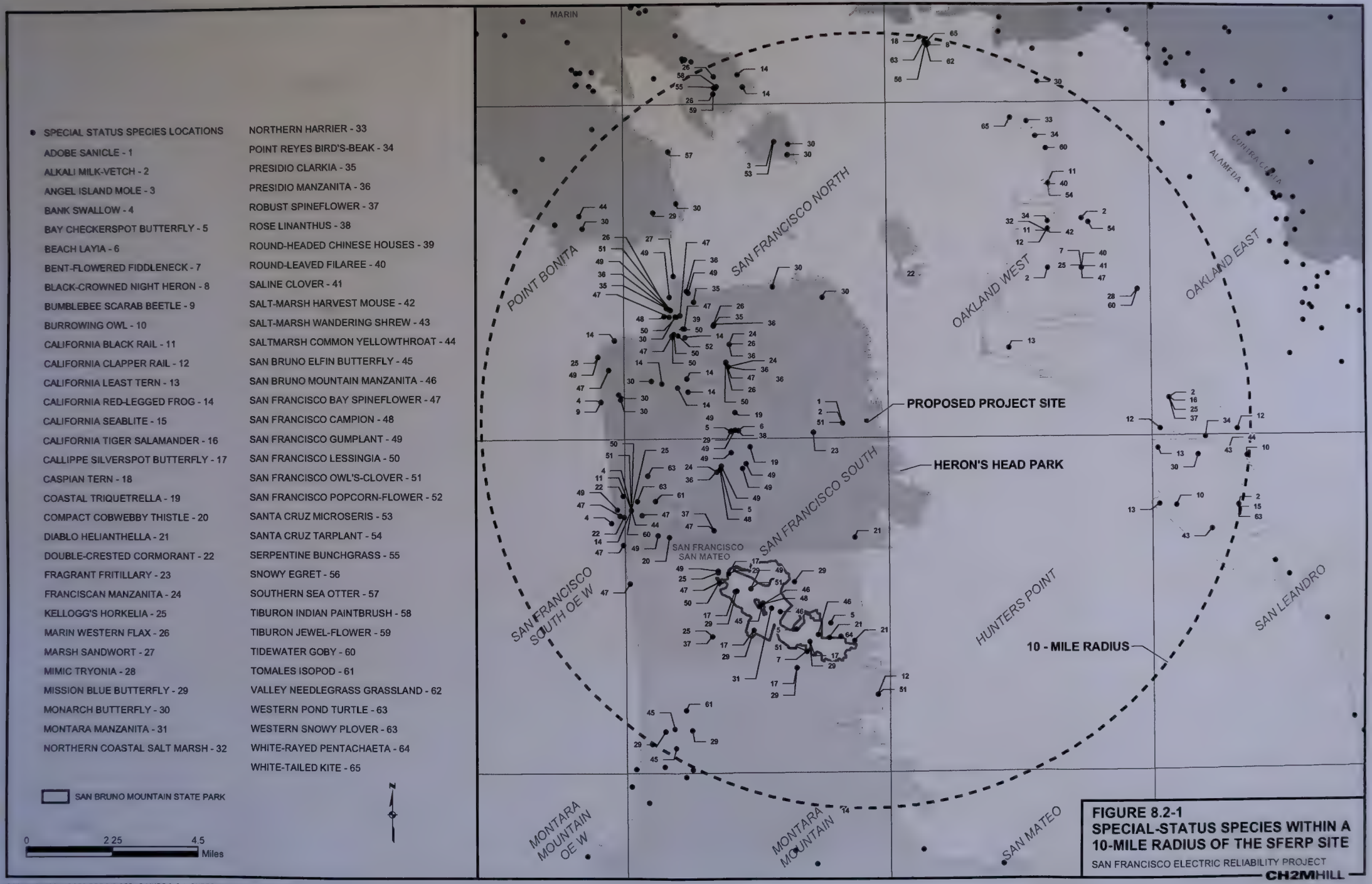


FIGURE 8.2-1
SPECIAL-STATUS SPECIES WITHIN A 10-MILE RADIUS OF THE SFERP SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
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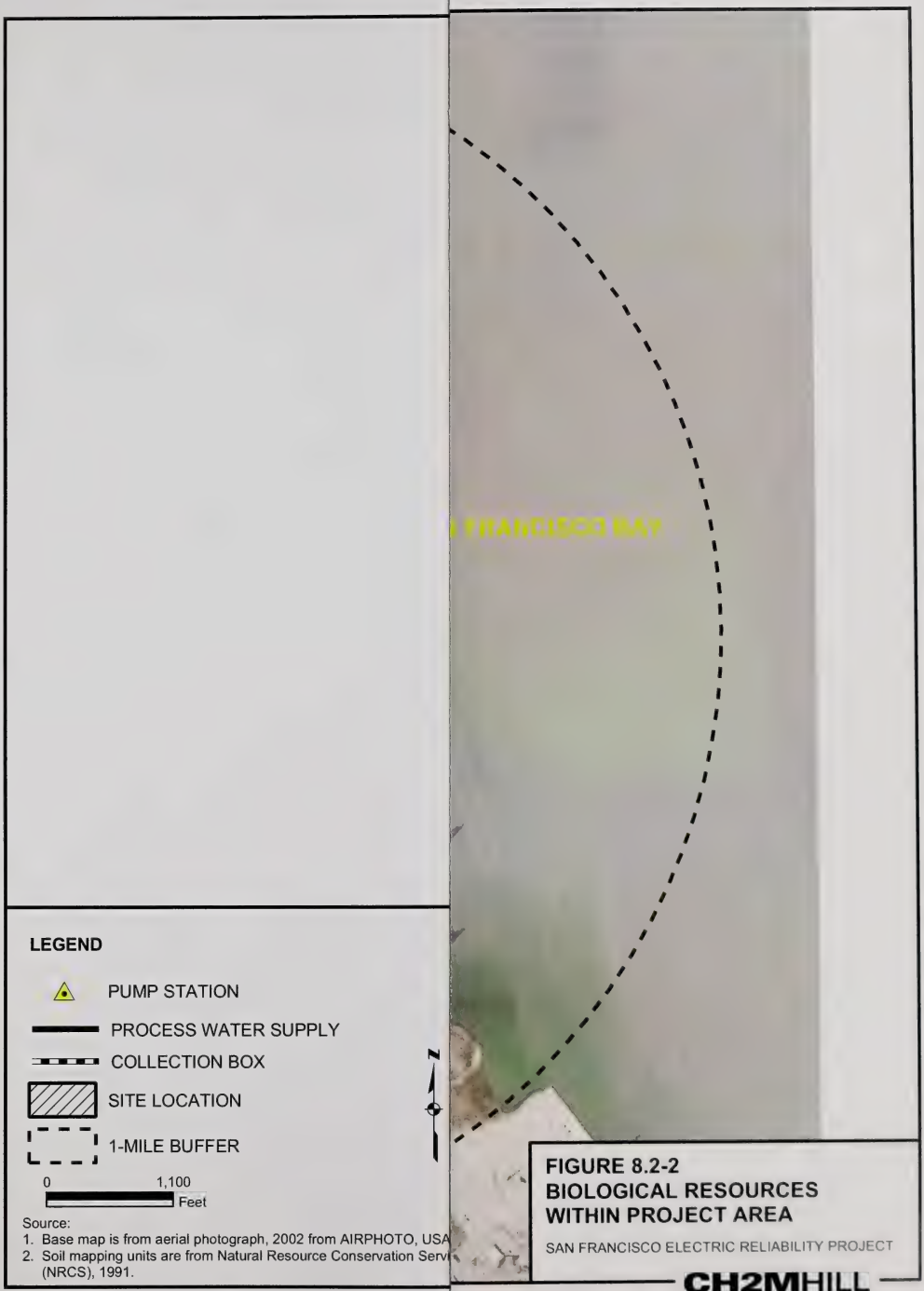


FIGURE 8.2-2
BIOLOGICAL RESOURCES WITHIN PROJECT AREA

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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FIGURE 8.2-2
BIOLOGICAL RESOURCES WITHIN PROJECT AREA

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SUBSECTION 8.3

Cultural Resources

8.3 Cultural Resources

8.3.1 Introduction

This subsection discusses the environmental setting, consequences, regional and local impacts, and mitigation measures associated with the cultural resource aspects of the San Francisco Electric Reliability Project (SFERP). Subsection 8.3.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to cultural resources. Subsection 8.8.3 describes the environment that may be affected by SFERP construction and operation. Subsection 8.3.4 identifies environmental consequences from development of the power plant and its associated laydown site and water supply pipeline, and Subsection 8.3.5 discusses cumulative impacts. Mitigation measures are discussed in Subsection 8.3.6. Subsection 8.3.7 presents the agencies involved and provides agency contacts. Subsection 8.3.8 presents the required permits and permitting schedule. Subsection 8.3.9 provides references used to prepare this subsection. Resumes of the preparers are provided in Appendix 8.3A.

The SFERP project is located at the corner of Illinois and 23rd streets in the Potrero District of the San Francisco (City). Land use in the vicinity of the proposed SFERP project site is predominantly industrial to the north, south, and west. The San Francisco Bay is located east of the proposed site. The laydown site is located on a vacant parcel flanked by Maryland and 26th streets, and the water supply pipeline is located on 23rd, Tennessee, Cesar Chavez, Mississippi, and Marin streets (see Figure 8.3-1 at the end of this subsection).

Cultural resources include prehistoric and historic archaeological sites[1]; districts and objects; standing historic structures, buildings, districts and objects; and, locations of important historic events, or sites of traditional/cultural importance to various groups.[2] Primary data sources used to prepare this section include the CEC testimony by Reinoehl and Mason (2002) who incorporated the results of several documents, including: Mirant (2001a, b), SECAL (2000a-c, 2001a-d), URS/Dames & Moore (2000), and Wirth Associates (1979).

1 "Site" – "the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure…where the location itself possesses historic, cultural, or archeological value" (USNPS-IRD, 1991:15).

2 The "federal" definitions of cultural resource, historic property or historic resource, traditional use area, sacred resources are reviewed below and are typically applied to non-federal projects.

A cultural resource may be defined as a phenomenon associated with prehistory, historical events or individuals or extant cultural systems. These include archaeological sites, districts and objects; standing historic structures, districts and objects; locations of important historic events; and, places, objects and living or non-living things that are important to the practice and continuity of traditional cultures. Cultural resources may involve historic properties, traditional use areas and sacred resource areas.

Historic property or historic resource means any prehistoric district, site building, structure or object included in, or eligible for, inclusion in the National Register of Historic Places. The definition also includes artifacts, records and remains that are related to such a district, site, building, structure or object.

Traditional use area refers to an area or landscape identified by a cultural group to be necessary for the perpetuation of the traditional culture. The concept can include areas for the collection of food and non-food resources, occupation sites and ceremonial and/or sacred areas.

Sacred resources applies to traditional sites, places or objects that Native American tribes or groups, or their members, perceive as having religious significance.

8.3.2 Laws, Ordinances, Regulations, and Standards

Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431 et seq.) and subsequent related legislation, policies, and federal agency regulations and guidelines for implementation of the Antiquities Act.

The following laws, ordinances, regulations, standards, and policies apply to the protection of cultural resources in California. Projects licensed by the Energy Commission are reviewed to ensure compliance with these laws. Table 8.3-1 summarizes applicable LORS.

8.3.2.1 Federal

- National Historic Preservation Act, 16 USC 470, commonly referred to as Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties through consultations beginning at the early stages of project planning. Regulations revised in 1997 (36 CFR Part 800 et seq.) set forth procedures to be followed for determining eligibility for nomination, the nomination, and the listing of cultural resources in the National Register of Historic Places (NRHP). The eligibility criteria and the process are used by federal, state, and local agencies in the evaluation of the significance of cultural resources. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the State Register of Historic Resources. Recent revisions to Section 106 in 1999 emphasized the importance of Native American consultation.
- Executive Order 11593, "Protection of the Cultural Environment," May 13, 1971 (36 Federal Register 8921), orders the protection and enhancement of the cultural environment by providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.
- American Indian Religious Freedom Act; 42 USC 1996 protects Native American religious practices, ethnic heritage sites, and land uses.

8.3.2.2 State

- Public Resources Code, Section 5024.1 establishes a California Register of Historical Resources [CRHR]; sets forth criteria to determine significance; defines eligible properties; and lists nomination procedures.
- Public Resources Code, Section 5097.5 states that any unauthorized removal or destruction of archaeologic or paleontologic resources on sites located on public land is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.
- Public Resources Code, Section 5097.9 prohibits the interference with the free expression of Native American religion as provided in the United States Constitution and the California Constitution; and causing severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine on public property, except on a clear and convincing showing that the public interest and necessity so require.

TABLE 8.3-1
Applicable Cultural Resource Laws, Ordinances, Regulations, and Standards

LORS	Requirements	Applicability
National Historic Preservation Act, Section 106	Requires federal agencies to take into account the effects of their undertakings on cultural resources	No
Executive Order 11593	Orders protection and enhancement of the cultural environment	No
American Indian Religious Freedom Act	Protects Native American religious practices, ethnic heritage sites and land uses	No
California Public Resources Code Section 5024.1	Establishes California Register of Historical Resources	Yes
California Public Resources Code Section 5097.5/5097.9	Prohibits causing severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require.	Yes
California Public Resources Code Section 5097.98/5097.99	Requires notification to most likely descendants in the event a Native American grave is encountered. Imposes penalties for obtaining or possessing Native American human remains or artifacts.	Yes, if burials are discovered
California Public Resources Code Section 21083.2	Provides that if a lead agency determines that project has significant effect on "unique" archaeological resources the environmental impact report must address those issues.	Yes
California Public Resources Code Section 21084.1	Equates a significant effect on the environment with a substantial adverse change in significance of a historic resource	Yes
California Administrative Code, Title 14 Section 4307	Prohibits destruction of paleontological, archaeological and historical objects	Yes
CEQA Guidelines, Title 14 Code of Regulations Section 15126.4(b)	Discusses mitigation measures related to historical resources	Yes
CEQA Guidelines, Title 14 Code of Regulations Section 15064.5	Defines "historical resources", determines significance of impacts to archaeological and historical resources	Yes
CEQA Guidelines, Title 14 Code of Regulations Section 15064.7	Defines "cumulatively significant", describes "thresholds of significance"	Yes
California Penal Code, Section 622.5	Makes it a misdemeanor to willfully damage objects or things of archaeological or historical interest	Yes
California Health and Safety Code, Section 7050.5	Requires that in the event of discovery of human remains, all excavation must cease until the coroner of the relevant county makes certain findings	Yes, if burials are discovered

TABLE 8.3-1
Applicable Cultural Resource Laws, Ordinances, Regulations, and Standards

LORS	Requirements	Applicability
San Francisco Building Code, Chapters 16B and 16C	Requires owners to undertake structural analysis of each unreinforced masonry wall; and to undertake alterations to conform to code or to demolish the structure	Yes
San Francisco Planning Code, Article 10	Provides for the designation of landmarks and historic districts, and recognition of structures of historic, architectural and aesthetic merit	Yes, if properties are initiated for land mark designation

- Pubic Resources Code, Section 5097.99 prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and sets penalties for these actions.
- Public Resources Code, Section 21083.2 states that if a project may affect a resource that has not met the definition of an historical resource set forth in Section 21084, then the lead agency may determine whether a project may have a significant effect on "unique" archaeological resources; if so, an EIR shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, such damage must be avoided. If they cannot be avoided, mitigation measures shall be required. The law also discusses excavation as mitigation; discusses the costs of mitigation for several types of projects; sets time frames for excavation; defines "unique and non-unique archaeological resources;" provides for mitigation of unexpected resources; and sets financial limitations for mitigation under the section.
- Public Resources Code, Section 21084.1 indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historic resource; the section further defines a "historical resource" and describes what constitutes a "significant" historical resource.
- Title 14, California Code of Regulation (CCR) Section 4307 (14 CCR 4307), states that no person shall remove, injure, deface or destroy any object of paleontological, archaeological, or historical interest or value.
- CEQA Guidelines, 14 CCR 15126.4, *Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects,* subsection (b) discusses impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource. Subsection (b) also discusses mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.
- CEQA Guidelines, Title 14 CCR 15064.5, *Determining the Significance of Impacts to Archaeological and Historical Resources.* Subsection (a) defines the term "historical resources." Subsection (b) explains when a project may be deemed to have a significant effect on historical resources and defines terms used in describing those situations.

Subsection (c) describes CEQA's applicability to archaeological sites and provides a bridge between the application of the terms "historical" resources and a "unique" archaeological resource.

- CEQA Guidelines, 14 CCR 15064.7, *Thresholds of Significance*. This section encourages agencies to develop thresholds of significance to be used in determining potential impacts and defines the term "cumulatively significant."
- California Penal Code, Section 622.5. This section provides that anyone who willfully damages an object or thing of archaeological or historic interest can be found guilty of a misdemeanor.
- California Health and Safety Code, Section 7050.5. If human remains are discovered during construction, the project owner is required to contact the county coroner.
- California Public Resources Code, Section 5097.98. If the county coroner determines that the remains are Native American, the coroner is required to contact the Native American Heritage Commission, which is then required to determine the "Most Likely Descendant" to inspect the burial and to make recommendations for treatment or disposition of the remains and any associated burial items.

8.3.2.2.1 State CEQA Process. CEQA requires a review to determine if a project will have a significant effect on archaeological sites or a property of historic or cultural significance to a community or ethnic group eligible for inclusion in the CRHR (CEQA Guidelines).

CEQA provides that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment (Section 21084.1 of the Public Resources Code). CEQA defines substantial adverse change as demolition, destruction, relocation, or alteration that the significance of a historical resource would be impaired (Section 5020.1). Section 21084.1 stipulates that any resource listed in, or eligible for listing in, the CRHR[3] is presumed to be historically or culturally significant unless the preponderance of evidence demonstrates the contrary.[4]

Resources listed in a local historic register or deemed significant in a historical resource survey (as provided under Section 5024.1g) are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates they are not.

A resource may be historically significant even if it is: 1) not listed in, or determined to be eligible for listing in, the CRHR, 2) not included in a local register of historic resources, and

3 The California Register of Historical Resources is a listing of "…those properties which are to be protected from substantial adverse change." Any resource eligible for listing in the California Register is also to be considered under CEQA.

4 A historical resource may be listed in the California Register of Historical Resources if it meets one or more of the following criteria: "(1) is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; (2) is associated with the lives of persons important to local, California or national history; (3) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or, (4) has yielded or has the potential to yield information important in prehistory or history (…of the local area, California or the nation)" (Public Resources Code §§5024.1, Title 14 CCR, Section 4852). Automatic CRHR listings include National Register of Historic Places (NRHP) listed and determined eligible historic properties (either by the Keeper of the NRHP or through a consensus determination on a project review); State Historical Landmarks from number 770 onward; Points of Interest nominated from January 1998 onward. Landmarks prior to 770 and Points of Historical Interest may be listed through an action of the State Historical Resources Commission.

3) not deemed significant in a historical resource survey (Section 21084.1; see Section 21098.1).

CEQA requires a Lead Agency to identify and examine environmental effects that may result in significant adverse effects. Where a project may adversely affect a unique archaeological resource,[5] Section 21083.2 requires the Lead Agency to treat that effect as a significant environmental effect and prepare an Environmental Impact Report (EIR). When an archaeological resource is listed in, or is eligible to be listed in, the CRHR, Section 21084.1 requires that any substantial adverse effect to that resource be considered a significant environmental effect. Sections 21083.2 and 21084.1 operate independently to ensure that potential effects on archaeological resources are considered as part of a project's environmental analysis. Either of these benchmarks may indicate that a project may potentially have an adverse effect on archaeological resources.

Other state-level requirements for cultural resources management appear in the California Public Resources Code Chapter 1.7, Section 5097.5 (Archaeological, Paleontological, and Historical Sites), and Chapter 1.75, beginning at Section 5097.9 (Native American Historical, Cultural, and Sacred Sites) for lands owned by the state or a state agency.

The disposition of Native American burials is governed by Section 7050.5 of the California Health and Safety Code and Sections 5097.94 and 5097.98 of the Public Resources Code, and falls within the jurisdiction of the Native American Heritage Commission (NAHC).

If human remains are discovered, the San Francisco Medical Examiner (Coroner) must be notified within 48 hours and, until his arrival, there should be no further disturbance to the site where the remains were found. If the remains are determined by the coroner to be Native American, the Coroner is responsible for contacting the NAHC within 24 hours. The NAHC, pursuant to Section 5097.98, will immediately notify those persons it believes to be most likely descended from the deceased Native American so they can inspect the burial site and make recommendations for treatment or disposal.

8.3.2.3 Local

8.3.2.3.1 San Francisco City and County. The San Francisco Building Code, Chapters 16B and 16C, requires owners of unreinforced masonry walls to undertake a structural analysis. If the building does not meet the minimum standards of the code and any exceptions, the owner must structurally alter the building to conform to the code or have the building demolished. San Francisco Planning Code Article 10 provides a mechanism to encourage historic preservation in the case of permits for the alteration or demolition of buildings that are: 1) initiated as land marks, 2) designated as land marks, or 3) located within a district that has been designated as a historic district under Article 10. This article allows the City to maintain a list of buildings and structures which have been "officially designated by agencies of the State or federal government."

5 Public Resources Code 21083.2 (g) defines a unique archaeological resource to be: An archaeological artifact, object, or site, about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria: (1) contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information; (2) has a special and particular quality such as being the oldest of its type or the best available example of its type; or, (3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

8.3.3 Affected Environment

The project area is located on the San Francisco Peninsula, a northward extension of the Santa Cruz Mountains that separates San Francisco Bay from the Pacific Ocean. The project area is an industrial area within the City of San Francisco. The project is located on Potrero Point on the western shoreline of San Francisco Bay about 1.5 miles south of the Bay Bridge. Potrero Hill rises to an elevation of approximately 300 feet above sea level, one-half mile west of the project. The project area is industrial with the former Pier 70 shipyard complex to the north and warehouses to the south. Immediately west is the PG&E Potrero Substation and immediately east is Mirant's Potrero Power Plant. Another warehouse to the west of the substation separates the project from a residential area at the base of Potrero Hill, known as the Dogpatch Neighborhood. The project area is developed and covered by buildings and pavement.

There are two officially-recognized historic districts, Dogpatch and Pier 70, both of which are completely within the boundaries of, and are part of, a third, larger historic district called the Central Waterfront District (CWD).[6] These districts share common themes, focusing on the industrial nature of the area, along with the theme of residential and commercial development for local industrial workers and of the City of San Francisco.

The Central Waterfront District, with its embedded Dogpatch and Pier 70 districts, contains 243 buildings of CRHR status levels (status codes of 1, 2, 3, 4, 5, 7) in the state historic property file (or CHRIS List) that are individually listed on the NRHP (code 1), determined eligible (code 2), appear to be eligible (code 3), may become eligible (code 4), are eligible for local list only (code 5), or have not been evaluated or whose status is underdetermined (code 7). These include resources that might be contributors either to the larger district or the individual districts. Another 32 buildings have been evaluated as code 6 (determined ineligible or delisted); 29 are 6Z1 (found ineligible with no potential for listing); two are 6Z (found ineligible); and one is 6Y2 (found ineligible by consensus determination but not evaluated for local listing).

8.3.3.1 The San Francisco Electric Reliability Project (SFERP)

The area around the proposed SFERP 145 MW power plant and switchyard—an area about one mile in diameter and roughly bounded by Potrero Hill/I-280 on the west, San Francisco Bay on the east, Islais Creek on the south, and Mariposa Avenue on the north—has been the subject of a number of historic property inventory and evaluation efforts over the past two decades, often focused on areas immediately adjacent to the project site. During the course of these efforts almost every building over 50 years old has been evaluated for its eligibility under criteria of significance and integrity established by the NRHP, CRHR, or local San Francisco historic landmark ordinance. The result of these surveys is that the known universe of historic architectural resources in the area of the project site is well understood.

All buildings within the project site have been recently inventoried and evaluated. Moreover, the project site was subject to a recent (2002-2003) CEC proceeding as a part of Mirant's Potrero Unit #7 AFC (see documents filed with Application for Certification,

6 The inventory of the Central Waterfront District was completed in October of 2001 under a grant from the SHPO to the San Francisco Planning Department. It was approved by the San Francisco Planning Commission and is currently under review at the SHPO for its potential to be included in the CRHR. See: San Francisco Planning Department, "Central Waterfront Cultural Resources Survey Summary Report and Draft Context Statement, October 2000 – October 2001." CEC Dockets, 00-AFC-4.

Mirant Corporation's Potrero Power Plant Unit 7 Project, Docket No. 00-AFC-4.). During these proceedings two buildings—the Meter House and the Compressor House, both part of the old San Francisco Gas and Electric Company gas works complex—were determined by CEC staff to meet the criteria for listing in the CRHR (CEC 2002:5.4-14-15). One of the other historic-era buildings within the project site, known as Station A, was the subject of conflicting testimony. Witnesses sponsored by the City testified that Station A should be considered a historical resource under CEQA, notwithstanding the condition of the building, because of its historic context and unique historic attributes. Witnesses sponsored by Mirant and staff testified that Station A should not be considered a historical resource under CEQA because it lacks integrity pursuant to the criteria of the National Register. Across 23rd Street to the south are two historic sugar industry warehouses.

In addition, the proposed laydown area (bounded roughly 25th Street on the north, 26th Street on the south, the bay on the east, and Michigan Street on the west) was examined as a part of the Central Waterfront District survey and the present project. Since the area is fenced, there was limited access to the site; however, it appears (from the public right-of-way) to have no historic period structures (at least 45 years old). A concrete mixing plant, temporary offices and containers are currently located on the site. An aerial photograph dated July 1993 shows the area as completely vacant.[7]

Given the existence of various inventory projects, no additional inventory or evaluation was undertaken. Rather, this section addresses the impacts the project may have on the known and existing historical resources on or around the project site as defined under state law and local ordinances. The following text briefly summarizes the history of the project area, discusses the main themes and contexts, describes the resources on the project site and in the project area, and summarizes project impacts.

8.3.3.2 Prehistoric Setting

The earliest documented occupation of the area between San Francisco and Monterey bays dates to about 8,000 years before present (BP). Prior to about 2,000 BP, archaeological evidence suggests that this area was occupied by small groups of hunter-gatherers that exploited both terrestrial and marine resources (mostly shellfish). Approximately 2,500 BP, large shellmound sites began to be occupied around San Francisco Bay. These sites were likely habitation sites with dense shell midden, flaked and ground stone tools, bone tools, beads, ornaments, charmstones, and burials. The shellmounds were occupied until the arrival of the Spanish.

The main marine resource used was shellfish, mostly oysters and bentnose clams. The most important upland resource was acorns gathered from oak trees in the fall. Acorn processing (leaching out the tannic acid and grinding into acorn meal) required a significant amount of labor. Use of acorns as early as 2,500 BP indicates intensification of resource procurement at a relatively early period in prehistory in this area. The beginning of the use of the shellmound sites around San Francisco Bay may correspond with the arrival of Utian language speakers from the Delta area. These Utian speakers were the ancestors of the Costanoans who occupied the Bay Area when the Spanish arrived.

7 TerraServer, http://terraserver-usa.com/printimage.aspx?T=1&S=10&X=2771&Y=20892&Z=10&P=San+Francisco%2c+California%2c+United+States&D=10+Jul+1993, accessed December 20, 2003

8.3.3.3 Ethnographic Background

The project area lies within the territory occupied by the Native American group (known to the Spanish and 20th century ethnographers) as the Costanoan. The contemporary descendants of this group are members of the Ohlone Indian Tribe. The Costanoan group occupied the coast of California from San Francisco to Monterey and inland to include the coastal mountains from the southern side of the Carquinez Straits to the eastern side of the Salinas River south of Chalone Creek. Costanoan refers to a language family consisting of eight related languages. Each language was spoken by different ethnic groups within their established geographical area. The political units within each ethnic group were tribelets; each tribelet varied from 50 to 500 people with the average being about 200. Each tribelet had one or more permanent villages and several temporary camps within its territory. Hunting and gathering groups lived in temporary camps when securing resources within the tribelet territory away from the village.

The Ramaytush language speakers occupied the project area. It is estimated that some 1,400 speakers were present in 1770. The Ramaytush speakers were divided into at least 10 tribelets. Each tribelet had a chief, a position inherited patrilineally (through the father's side). The chief fed visitors, directed ceremonial activities, organized hunting, fishing, and gathering activities and directed warfare expeditions. The coastal Costanoan traded with the inland Yokuts (mussels, abalone shells, dried abalone meat, and salt for piñon nuts and other inland products). Acorns from four species of oak were the most important plant food. Nuts, berries, seeds, and roots were also important. Costanoan groups practiced controlled burning of the chaparral to encourage sprouting of seed plants and improve deer and elk browse. The most important foods were deer, rabbit, steelhead, salmon, sturgeon, lampreys, oysters and clams.

The Costanoan lived in thatched dome houses with rectangular doorways and a central hearth. Other structures in the villages included sweathouses, dance enclosures, and an assembly house. Technology included tule balsa canoes, bows and arrows, and baskets. Chipped stone tools were made from chert obtained locally and obsidian obtained in trade with others. Between 1770 and 1797,the Spanish established 7 missions in Costanoan territory. Due to introduced European diseases and a declining birth rate, their population decreased from about 10,000 to 2,000 by 1832.

8.3.3.4 Historic Setting

Spanish explorers intent on settling the Pacific Coast first reached the San Francisco Bay in 1769, and by 1776, Juan Bautista de Anza, Jose Joaquin Moraga and Fathers Francisco Palou and Pedro Cambon established the Mission Dolores (San Francisco) and the San Francisco Presidio. Mission Dolores was one of 21 Spanish missions extending from San Diego in the south to the mission San Francisco Solano in Sonoma in the north, all established between 1769 and 1823. The presidio was one of four established by the Spanish prior to 1800. In 1774, a fort was also established at Castillo de San Joaquin, later Fort Point. The early history of California is well documented in many sources, including Rice, et al. (1996) and Hoover, et al. (1990).

The Spanish era ended when Mexico won its independence from Spain in 1821. The missions were secularized by the mid-1830s, and former mission lands were granted to soldiers and other Mexican citizens for use as cattle ranches. Mexicans, Europeans, and

Americans came to California to take advantage of the generous land grants of the Mexican government. The end of Spain's imperialist policies led, by the 1830s, to a lively hide and tallow trade between the inland ranches and the settlements in the San Francisco Bay Area. The little cove settlement of Yerba Buena, the forerunner of the City of San Francisco, was founded by Captain William A. Richardson in 1835. As Pacific Coast trade increased through the 1830s and 1840s, the center of activity in the Bay Area was the natural anchorage for trading ships at Yerba Buena. In the summer of 1846, war between Mexico and the US led to the American occupation of San Francisco (see Cole 1981:13-19 and Hoover, et al. 1990:331-334).

American success in the Mexican-American War in 1848, followed by the Gold Rush of 1849, brought large numbers of Anglo-Americans to San Francisco. As a result, the city experienced many significant changes because it was the port closest to the gold fields. It quickly developed into a shipping and transportation center for a state that was remote and isolated from the rest of the country. Other towns grew around the Bay Area, such as Oakland (incorporated in 1852), and San Jose, which served as the State's first capital in 1849. However, San Francisco far outpaced these areas, which developed more fully after the transcontinental railroad was completed in the Bay Area in 1869. Bay Area towns provided commercial, warehousing, financial, and manufacturing services for the inland mining and agricultural areas of the state (Hoover, et al. 1990:335; Beck and Haase 1974:30).

In 1847, the local government changed the name of Yerba Buena to San Francisco. As noted, at that time it was a small village fronting a large mud flat and cove that became an instant city in a few short years. Speculators and promoters surveyed a town site in 1847 and began selling lots, some of which were under water. Portions of the bay and Yerba Buena Cove were filled with the hulks of abandoned ships and other material to create more land for development. By late 1849 development of the City had spread well beyond the bounds of Yerba Buena Cove onto the surrounding area's flats and hills. Shipping companies built wharves hundreds of yards into the bay during the early 1850s. Wells Fargo, Adams and Company, and the Merchants Exchange established headquarters in San Francisco in 1853, as did other commercial institutions soon thereafter; making the City the center of the State's economic activity. The population of San Francisco reached 57,000 in 1860 (Rice, et al. 1996:221-226; Soule 1855:301-305, 437-441; and Cole 1981:43-44).

The City expanded along the waterfront to the south and west from Yerba Buena Cove, which was located on the northeast end of the San Francisco peninsula. The Potrero Point area, where the project area is located, is a small finger of land projecting out into the bay south of the core of San Francisco. The city's industrialists developed it as an early industrial area. This area extended from the waterfront to Potrero Hill, located approximately one mile inland. The area was well located at the southern end of the city, close enough to serve as a convenient industrial location but south of the main portion of the new city. By 1855, heavy industry began locating at Potrero Point, including a black powder plant located at the point owing to its isolated location. The explosives industry remained at the point until about 1880, when encroachment by residential areas led to its relocation to other areas (San Francisco Planning Department 2001).

By the 1880s, the Potrero Point area consisted of a grid of streets sparsely populated with warehouses, docks and industrial complexes, roughly bounded by 16th Street on the north and 26th Street on the south. There were numerous substantial industrial and commercial

establishments located at Potrero Point in the vicinity of the waterfront. These included the Pacific Rolling Mills Company, Union Iron Works, and the San Francisco Cordage Factory and Rope Works on the north side of the point, and the California Sugar Refinery and the works of the City Gas Company on the southern end. The California Sugar Refinery was established by Claus Spreckels in 1881, was renamed the Western Sugar Refinery in 1891, and eventually expanded to border Louisiana and Humboldt streets on the east and north and the waterfront on the south and west. North of the California Sugar Refinery was the gas manufacturing plant of the City Gas Company, established at Potrero Point in 1872. The plant was located on blocks bounded by Georgia, Massachusetts, and Humboldt Streets, and its facilities included two 1,038,000-cubic-foot gas storage tanks. Portions of this well-equipped complex survived, and were later incorporated into the PG&E plant built at the site. The industrial and storage works of the California Sugar Refinery, and the City Gas Company plant, were the first major developments to occur in the project location (San Francisco Planning Department 2001:8-9; Sanborn 1886-1887, 1900; USGS 1895, 1899; and Coleman 1952:28-29).

The Western Sugar Refinery complex at Potrero Point was established to refine and produce sugar made from Hawaiian sugar cane. It eventually became the largest sugar refinery in the western United States. The facility consisted of several multi-story brick buildings that functioned as a refinery, and filter house. The complex also consisted of several brick warehouses, coal bunkers, storage tanks, a sack house, stock corrals, a large storage reservoir, and wharves. A Southern Pacific Railroad spur ran down 23rd street to the wharf. The refinery operated until 1949, when it was purchased by its major competitor, the California and Hawaiian Sugar Refining Corporation (C&H) (Sanborn Fire Insurance Maps, 1900, 1915, 1950; San Francisco Planning Department 2001:10-11). C&H also had an extensive factory complex with ocean-shipping facilities in Crockett on the Carquinez Straits.

The first decades of the 20th century were a period of rapid expansion in the Bay Area. In the Potrero area, industrialists filled the shallows in the bay to the south of Potrero Point between 1899 and 1914, and constructed a wharf along the south end of Potrero Point. During the same period the San Francisco Shipyard was constructed on the north end of Potrero Point. The area underwent a period of reconstruction and further expansion after the devastating 1906 earthquake that destroyed many 19th century buildings and structures in San Francisco.(USGS 1899, 1915). Buildings in the gas works and in the sugar complex survived the disaster.

The San Francisco Gas and Electric Company (SFG&E) purchased the City Gas Works Plant at Potrero Point in 1897. Formed from a consolidation of the San Francisco Gas and Light Company and Edison Light and Power Company in 1896, SFG&E had absorbed many smaller competitors by 1901. However, at that time there were other companies competing for customers in a rapidly expanding utility industry, resulting in an intense rate war.

This rate war was illustrated by two competing utility companies with plants at Potrero Point. One of SFG&E's competitors was Claus Spreckels, who, in 1899 and 1901, incorporated the Independent Electric Light and Power Company and Independent Gas and Power Company. In 1901, Spreckels built an electric generating plant adjoining his Western Sugar Refinery at Potrero Point, located south of the SFG&E plant at Potrero. The state-of-the-art plant consisted of a large brick structure that housed a steam-powered electrical generating plant with a 5,000-kilowatt capacity, and had an adjoined gas plant.

The plant was constructed on the west side of Louisiana Street, on the site formerly owned by the California Barrel Company. The rate war ensued until 1903, when Spreckels and others sold their works to SFG&E, ending the competition. In 1906, the San Francisco Gas & Electric was renamed Pacific Gas & Electric (PG&E), and the former Spreckels facility at Potrero, which was more modern and up-to-date than the other SFG&E facility at Potrero, became known as Station A. It was one of two power plants in the area that survived the 1906 earthquake and was subsequently expanded as the city was rebuilt. By 1914, the PG&E facility was expanded to the west between Louisiana and Michigan Streets, including the construction of large 1- and 5-million-cubic-foot gas holders. During this year the Meter House was constructed. The plant was also expanded to the south of 23rd Street, with a gas pump and gas holder constructed near the south wharf at Potrero Point (Coleman 1952:82-91, 236; Sanborn Fire Insurance Maps 1900, 1914).

PG&E's Station A was the largest steam electric plant west of the Rocky Mountains from 1903 through 1913, and supplied almost all of San Francisco's electricity during this period. In 1924, the Compressor House was constructed on the site. Later, when PG&E developed cheaper hydroelectric power, Station A was used to supplement the hydroelectric power during periods of peak use. PG&E modernized the station's equipment throughout the years, and with the continuing upgrades Station A remained in operation until 1983. The company placed the Potrero gas plant on standby from 1929 to 1960, when much of it was demolished (California Energy Commission 2002:5.4.7).

Fire insurance maps prepared between 1915 and 1950 show that the south end of Potrero Point was occupied by the PG&E facility and the Western Sugar Refinery (C&H). During this period Kentucky Street was renamed Third Street. Between 1915 and the early 1940s many of the PG&E and Western Sugar Refinery structures remained at the waterfront between 22nd and 23rd street, but the structures along the south wharf were replaced. By the 1950s, much of the C&H sugary refinery had been removed, and by the mid-1960s, many of the PG&E structures north of Humboldt Street had also been removed (Sanborn Fire Insurance Maps 1914, 1950; USGS 1915, 1942, 1946, 1947a,b, 1948, 1950, 1956, and 1968; San Francisco Planning Department 2001:10-11). The dense concentration of industrial buildings on the location of the PG&E and C&H complexes can be seen in several historic photographs included in the CWD report, especially Figure 6, an aerial photograph taken between 1929 and 1934. This image shows the complex of buildings that served the sugar industry east of Station A, all of which have since been removed (San Francisco Planning Department 2001:14).

8.3.3.5 Resources Inventory

The SFERP project site (and laydown area) lie within the area researched by Southern Energy California (SECAL)/Mirant for the proposed Potrero Unit 7 Project (00-AFC-4). Records searches were conducted by previous consultants at the Northwest Information Center of the California Historic Resources Information System (CHRIS). The record searches did not identify any previously recorded prehistoric cultural resources within one-quarter mile of the SFERP project. An updated CHRIS records search (NWIC 03-548) was conducted on February 3, 2004 for this project to check for recorded resources in areas not checked for the Potrero project (e.g., the Islais Creek local and surrounding streets) because the Potrero project footprint did not include streets subject to excavation for the water supply pipeline and the laydown site.

The previous CHRIS record searches indicated that two previous cultural resources investigations covered the SECAL/Mirant Potrero project area. One of the investigations was completed by Wirth Associates (1979) for an earlier expansion of the Potrero Power Plant. Part of the brick foundation of one of the mid-19th century powder magazines discussed above was found in a trench excavated in the northeastern part of the power plant. This feature was not included in the record search results, indicating that a site record form had not been submitted to CHRIS. The other investigation was prepared for the 1998 EIR for the sale of PG&E power plants (that included the Potrero Power Plant). This investigation did not identify any archaeological resources in the SFERP project area, but concluded that there was a low to moderate potential for buried prehistoric resources and a moderate to high potential for buried historic resources. Several industrial buildings more than 50 years old were identified in the project vicinity, mostly located west of Third Street. The I.M. Scott School, built in 1895 and located at 1060 Tennessee Street, is San Francisco Historical Landmark 138 (SECAL 2000c).

Another SECAL/Mirant record search identified underwater cultural resources such as shipwrecks that could be affected by Potrero Unit 7 project discharge pipelines in the bay. No shipwrecks or other underwater cultural resources were identified (SECAL 2000c). SECAL/Mirant consulted previous evaluations of historic structures in the project area including evaluation of structures on the power plant parcel (SECAL 2001c) and evaluation of structures in the Southern Waterfront survey area that included the adjacent Union Iron Works, Pier 70 Historic District (SECAL 2001b). In 2002 the San Francisco Department of Planning conducted a cultural resources survey of the Central Waterfront (which included the power plant property) sponsored by the State Office of Historic Preservation (see San Francisco Planning Commission 2001). The survey was accepted by the San Francisco Planning Commission and forwarded to the State Office of Historic Preservation to review the eligibility of the District for listing in the CRHR. While the survey included the project site, it specifically identified that no original survey work was undertaken as to that site. Instead the survey made references to prior survey work on the site. (per Mark Paez, 3/4/04). The CWD report recommended that "extant P.G.&E. and Western Sugary [sic] Refinery resources should be examined as contributors to a potential Pier 70 historic district or as resources within a potential stand-alone historic district" and "at the very minimum, the Central Waterfront area's historic resources should be given special consideration" in local land use planning (San Francisco Planning Commission 2001:10, 27).

CHRIS records search NWIC 03-548 revealed no recorded archaeological resources in the SFERP project area. A prehistoric archaeological site, CA-SFR-15 (P-38-000015) is recorded approximately 0.5 miles south of Marin Street (which is the terminus of the proposed water supply pipeline). A historic resource (P-38-004274) is located just south of CA-SFR-15 (and is approximately 0.6 miles south of Marin Street). Resource P-38-004274 is the Islais Creek Sewage Treatment Plant, which was recommended by its recorder as NRHP Status Code 3S (eligible under Criterion C for design qualities at the local and regional levels of significance)(Kelley 2002). No resources are recorded on or adjacent to the construction laydown site.

8.3.3.5.1 Field Surveys. No new archaeological field surveys were conducted for the SFERP project because recent previous surveys have already covered the subject project site. The laydown area, which has been recently graded, and partially gravelled, contains no

permanent structures. The laydown was not inspected because underlying soils will not be disturbed by the project. The water supply pipeline will be routed through an existing concrete pipe trench and along existing paved streets; therefore, native soils underlying these streets are covered and cannot be inspected. SECAL/Mirant conducted an archaeological survey of the Potrero project property and its associated underground transmission routes. The survey of the Potrero site was conducted in 1999 and 2000 by Mark Hale (SECAL 2001a).

An historic architectural resources survey was conducted for the Potrero site and all properties directly adjacent by Michael Corbett and Denise Bradley (SECAL 2001a-d).

As reported by Reinoehl and Mason (2002:5.4-9), the Potrero property is completely developed and covered by structures and pavement. Some of the property consists of fill placed to reclaim land from San Francisco Bay. Other areas have fill placed to raise the original land surface to create a level area of building. In one such area, the remnants of a powder magazine built in the late 1850s were discovered in an exploratory trench (Wirth Associates 1979). No archaeological resources were identified as a result of the SECAL/Mirant's archaeological surface survey, a predictable result, given the inability to see the original ground surface (SECAL 2001a).

Because of the potential for encountering submerged buried cultural resources in the bay, the geotechnical boring and sediment sampling for the Potrero project was monitored. Eucalyptus fragments found in a geotechnical boring at a depth of 9 to 23 feet suggest the presence of a wood pile at the location. Small wood fragments were found in 8 of the 31 sediment samples. No other historical material was recovered. The eucalyptus wood pile and small wood fragments were interpreted as representing remnants of the East Wharf/Sugar Dock associated with the Western Sugar Refinery. The wharf was the only structure built in the water in the Potrero project area and was demolished sometime between 1950 and 1975. The eucalyptus wood pile may have supported the wharf. The small wood fragments probably represent remnants of the wharf material deposited on the bayfloor after demolition (SECAL 2000c). It is not likely that historical material dating prior to the 20th century exists on the bay floor in the project area. This area was probably dredged in order to accommodate large ships carrying sugar that moored at the East Wharf. Vessels over 400 feet in length are shown moored at the East Wharf of the Western Sugar Refinery in photos dating to the 1930s and 1940s (SECAL 2000c).

8.3.3.5.2 Resources on the Project Site. The SFERP project site contains a number of structures including three older buildings:

- The Meter House
- The Compressor House
- Station A

During hearings regarding Potrero 7, all witnesses addressing cultural resources, including CEC staff, agreed that the Meter House and the Compressor House meet the criteria for listing in the California Register of Historical Resources (CRHR) and should be considered historic resources under CEQA.

With regards to Station A, there was conflicting testimony. Witnesses sponsored by the City testified that Station A also meets the criteria for listing in the CRHR notwithstanding the

condition of the building.[8] However, witnesses sponsored by Mirant and CEC staff testified that approximately one half of Station A has been demolished, and concluded that the building no longer met the criteria for listing on the CRHR because it lacks historic integrity.[9] All three of the masonry buildings on the site are currently subject to the Unreinforced Masonry Ordinance (codified in the San Francisco Building Code, Chapters 16B and 16C) and, if they were to remain onsite will need to be rehabilitated.

8.3.3.5.3 Resources Outside the Project Site that May Be Subject to Indirect Impacts. As noted above, the area within the general boundaries of the Central Waterfront District (CWD) (which includes within its boundaries the Dogpatch and Pier 70 districts) has been thoroughly inventoried and, in most cases, its resources 50 years old or older have been evaluated. Table 8.3B-1, in Appendix 8.3B, lists the resources within the CWD, and notes if they are known to be in another established district (i.e., Dogpatch or Pier 70).

8.3.3.5.4 Resources on the Laydown Site. There are no standing buildings or structures on the laydown site. The laydown site lies on land that was reclaimed from San Francisco Bay in the early decades of the 20th century.

8.3.3.5.5 Resources Along the Water Pipeline Corridor. There are no standing buildings or structures within the proposed water pipeline corridor. A portion of the pipeline is routed within a concrete pipe collection box and along existing streets and will not encroach upon existing buildings or structures that flank the affected streets. Like the laydown site, much of the proposed pipeline route lies on land that was reclaimed from San Francisco Bay in the early decades of the 20th century. The western most portion of the proposed pipeline route (Marin and Mississippi Streets) appears to correspond to former bayshore or upland that once surrounded the saltwater wetlands associated with Islais Creek in the late 19th century (USGS 1896). The western portion of the proposed pipeline route may be an area of high probability for the presence of prehistoric archaeological resources. However, the pipeline will be contained within an existing collection box from Cesar Chavez and Indiana streets to its terminus at Marin Street (see Figure 2-1). The CHRIS records search conducted on February 3, 2004 revealed that the closest recorded archaeological site (CA-SFR-15) is located about 0.5 miles south of the southern terminus of the water pipeline at Marin Street.

8.3.3.5.6 Native American Contacts. SECAL/Mirant contacted the Native American Heritage Commission (NAHC) to obtain a list of concerned Native Americans living in the San Francisco Area. SECAL/Mirant sent letters to the Native Americans describing the project and asked about concerns. No responses were received. CH2M HILL also contacted the NAHC in December 2003, and received a list of concerned Native Americans. Letters were also sent to the listed Native Americans. No responses have been received through January 29, 2004 (Appendix 8.3C).

[8] Dr. Paul Groth, Prepared Testimony Regarding Cultural Resources in Docket No. 00-AFC-4 (July 8, 2002); Christopher Ver Plank, Prepared Testimony Regarding Cultural Resources in Docket No. 00-AFC-4 (July 10, 2002);Charles E. Chase, Prepared Testimony Regarding Cultural Resources in Docket No. 00-AFC-4 (July 10, 2002).

[9] Ward Hill, "Historic Architecture Report for Station A, Potrero Power Plant, December 1999"; CEC, Final Staff Assessment, Cultural Resources, 5.4-10, 5.4.15-16. February 13, 2003.

8.3.4 Environmental Consequences

This subsection assesses the potential environmental impacts of the project on cultural resources. Laws governing the treatment of cultural resources require the Energy Commission to categorize resources by determining whether they meet several sets of specified criteria. These categories then in turn influence the analysis of potential impacts (environmental consequences) to the resources and the mitigation that may be required to ameliorate any such impacts.

8.3.4.1 Significance Criteria

Under federal law, only historical or prehistoric sites, objects, or features, or architectural resources that are determined by a qualified researcher to be "important" or "significant" in accordance with federal guidelines need to be assessed for potential impacts. The significance of historical and prehistoric cultural resources is judged in accordance with the criteria for eligibility for nomination to the National Register of Historic Places (NRHP) as defined in 36 CFR 60.4. If such resources are determined to be significant, and therefore eligible for listing in the NRHP, as well as the California Register, they are afforded certain consideration under the National Historic Preservation Act and/or CEQA. The federal laws are not applicable to the SFERP project at this time because there is no known federal nexus.

The NRHP criteria state that "eligible historic properties" are: districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that: (a) are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or (d) that have yielded, or may be likely to yield, information important to history or prehistory. Isolated finds by definition do not meet these criteria.

Under federal law, resources determined not to be significant, that is, not eligible for NRHP listing, are subject to recording and documentation only, and are afforded no further protection. However, occasionally certain resources, although they may not be assessed as "significant," may nonetheless be of local or regional importance such that mitigation may be warranted regardless of their assessed significance. Energy Commission staff evaluates the survey reports and site records for any known resources located within or adjacent to the project area potential effects (APE) to determine whether they meet the eligibility criteria.

CEQA Guidelines now explicitly require the lead agency (the Energy Commission) to make a determination of whether a proposed project will affect "historical resources." The guidelines provide a definition for historical resources and set forth a listing of criteria for the California Register of Historical Resources (CRHR). These are essentially the same as the eligibility criteria of the NRHP. In addition, as with the NRHP, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. If the criteria are met and the resource is determined eligible for the CRHR, the Energy Commission must evaluate whether the project will cause a "substantial adverse change in the significance of the historical resource."

CEQA also contains a section addressing "unique" archaeological resources and provides a definition of such resources (Public Resources Code, Section 21083.2). This section

establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archaeological resources that are not unique. However, the CEQA Guidelines state that the limitations in this section do not apply when an archaeological resource has already met the definition of a historical resource (14 CCR 15064.5).

8.3.4.2 Potential Environmental Impacts to Historic Properties

8.3.4.2.1 Potential Environmental Impacts to Resources at the Project Site. As currently configured, the SFERP plant will require demolition of both the Compressor House and Station A. Recognizing the need to minimize adverse impacts on cultural resources, the City will rehabilitate the Meter House for use as an administration and control building. Demolition of the Compressor House, and to the extent Station A qualifies as a historic resource, Station A, would result in an impact on cultural resources that the City intends to mitigate.

Other modern structures located in the western portion of the project site may also be demolished (see Figure 8.3-1 for overview of project site and laydown area).

Assessing impacts on resources located outside the project site that may be subject to indirect impact by construction of the plant is a more complicated question. Consideration of the issue revolves around three questions:

1. Will the loss of the Compressor House and Station A have a significant indirect impact on surrounding significant resources or districts?
2. Will the construction of the project have a significant impact on the Meter House?
3. Will the construction of the project have a significant indirect impact on surrounding resources or districts?

The following discussion addresses each concept in turn.

Will the loss of the Compressor House and Station A have a significant indirect impact on surrounding significant resources or districts? Demolition of the Compressor House and Station A will not constitute a substantial adverse change in the significance of the CWD, Pier 70 District, and Dogpatch District as historical resources. The buildings are not within the Pier 70 or Dogpatch district boundaries. Moreover, they are screened from the Dogpatch District's viewshed by the large industrial buildings along the east side of 3rd Street that are at the southeast edge, but outside of, the Dogpatch District. A photosimulation of the view from the intersection of 20th and Mississippi streets towards the project site, depicts how this view from the Dogpatch area will be affected. This photosimulation appears in Subsection 8.11, Visual Resources (see Figure 8.11-6a, 6b). The boundaries of the Pier 70 District are to the north of the project site, although the buildings are visible from the Pier 70 District.

Assessing indirect impacts to the CWD differs from Pier 70/Dogpatch for several reasons. First, as described in Subsection 8.3.3.5, the District is still before the State Office of Historic Preservation for review of eligibility for listing in the CRHR.

Assuming, for the purposes of this application, that the CWD can be considered an historical resource, the loss of the Compressor House and Station A, will not materially alter the physical characteristics of the District as a whole in such a way as to disqualify it for inclusion

in the CRHR for lack of historic integrity. Although the Compressor House and Station A are among the last remaining resources related to the gas manufacturing industry in this area of San Francisco, they constitute two buildings among hundreds in the CWD that are representative of the district's wider historic context of, and relevant historical association with, the city's general industrial development. Furthermore, under the City's plan, the Meter House will be preserved and rehabilitated, with the result that one of the remaining gas manufacturing industry buildings within the district will be reused and reoccupied.

Thus, demolition of the Compressor House and Station A is not considered to be a significant indirect impact to the historic districts that include and surround the project site.

Will the construction of the project have a significant impact on the Meter House? The Meter House will suffer a direct impact owing to changes in setting occasioned by the demolition of the Compressor House and Station A and construction of the new project facilities. However, rehabilitation of the Meter House will importantly contribute to mitigation of the loss of the Compressor House and Station A.

Will the construction of the project have a significant indirect impact on surrounding resources or districts? Construction of a modern complex at the project site would not adversely impact the CWD as a whole, given that other modern buildings already exist within its boundaries and a large number of historic buildings will remain.

Two significant resources are located immediately adjacent to, and south of, the project site: the two sugar warehouses that share the address of 435 23rd Street. The two buildings were evaluated as eligible for the CRHR under Criterion 1 at a local level of significance, for their place in history of sugar refining in San Francisco and as the last remaining buildings from the Western Sugar Refinery (CEC, 2002). The period of significance for the buildings was set at the years from 1923 through 1948, when the company ceased operations in the city. The two warehouses are isolated remnants of a much larger facility, which in 1950 consisted of at least 16 buildings, including 4 multi-story buildings, large wooden warehouses, wharfs and docks, tanks, rail spurs and roadways. Except for one of the multi-story buildings and the 2 concrete sugar warehouses, all were demolished by 1950. The large multi-story building was demolished after July 1993, leaving the 2 warehouses currently extant as a remnant of the complex.[10]

The project will have no direct impact on these two warehouse buildings. There will be an indirect visual effect, owing to the change in adjacent setting caused by the demolition of Station A and the Compressor House, both of which are visible from the sugar warehouses, and their replacement with a modern complex of generating equipment and structures. However, given the fact that the sugar refinery complex of which they were originally a part has been essentially demolished (most recently the eastern one half of Station A, and the multi-story sugar warehouse once located directly to the north), and by virtue of the nature of construction in the area (these warehouses are bordered on the north by Mirant's Potrero generating facility and a modern trucking facility to the west), the indirect visual impacts

[10] Michael Corbett, Architectural Historian, URS Corporation, "Historic Architecture Report for 435 23rd Street, City and County of San Francisco, California, January 2001; URS Corporation, "Responses to CEC Data Requests (Set 6) Cooling Tower System Amendment Potrero Power Plant Unit 7, AFC," September 2003. See data requests 216-216 with responses; TerraServer, http://terraserver-usa.com/printimage.aspx?T=1&S=10&X=2771&Y= 20892&Z=10&P= San+ Francisco%2c+California%2c+United+States&D=10+ Jul+1993, accessed December 20, 2003

should be considered less than significant.[11] Photosimulations of the change from current conditions to proposed conditions, showing the sugar warehouses and the buildings on the project site, can be found in Section 8.11, Visual Resources (see Figure 8.11-6a, 6b).

8.3.4.2.2 Potential Environmental Impacts to Resources at the Laydown Site. The construction laydown site (see Figure 8.3-1) is vacant land that has been reclaimed from San Francisco Bay in past decades. All laydown operations will rest on existing graded/graveled surfaces. No subsurface ground alteration will take place; therefore, there would be no possibility that laydown operations could disturb any buried historic archaeological resources (if any are present). A CHRIS records search initiated February 2, 2004 is provided as confidential Appendix 8.3D.

8.3.4.2.3 Potential Environmental Impacts to Resources Along the Water Pipeline Corridor. As currently configured, the water supply pipeline will be constructed within a concrete collection box or along the shoulder of existing city streets (23rd Street, Tennessee Street, Cesar Chavez Street, Mississippi Street and part of Marin Street) (see Figure 8.3-1). Construction confined within the existing city streets will not affect the historic built environment.

Pipeline construction may affect historic or prehistoric archaeological resources that may be present beneath the city streets. Because the street grid pattern in this area has been stable since the end of the 19th century, construction in the existing streets is not expected to encounter historic building foundations. The potential exists, however, for construction to encounter historic debris that pre-dates the original paving of these streets (either by paving stones or by asphalt). The potential also exists for construction to encounter buried prehistoric archaeological resources, if any are present along the streets that now cover the Islais Creek locale (Marin, Mississippi and Cesar Chavez Streets). A CHRIS records search initiated February 2, 2004 as confidential Appendix 8.3D.

8.3.4.3 Potential Environmental Impacts to Subsurface Archeological Resources

Since project development and construction usually entail surface and subsurface disturbance of the ground, the proposed SFERP project has the potential to adversely affect previously unknown cultural resources. Direct impacts are those that may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities (grading), excavation (for pipelines) or demolition. Indirect impacts are those that may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility.

The potential for the project to cause impacts to cultural resources is related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Although known resources are absent, unknown resources could be encountered and impacts could occur. In addition, the potential for discovery does not measure the significance of individual artifacts or other cultural resources present, since it is impossible to accurately predict what specific materials could be encountered. Furthermore, sometimes the full significance of discovered cultural

[11] It should be noted that this was the conclusion reached by CEC staff in its FSA for the Mirant project. See CEC, Final Staff Assessment, Cultural Resources, 5.4-10, 5.4.15-16. February 13, 2003.

resources can only be determined after they have been collected, prepared, and studied by professional archaeologists, historians and/or architectural historians.

Available information points to high sensitivity for buried prehistoric resources in the southern portions of the proposed water supply pipeline. Fortunately, much of the southern portion of the pipeline will be contained within an existing collection box. The presence of a prehistoric shellmound (CA-SFR-15) recorded by pioneering U.C. Berkeley archaeologist Nels Nelson in 1910 about 0.5 miles south of Marin Street confirms the prehistoric occupation of Islais Creek and its former saltmarsh area.

Actual construction is expected to occur from second quarter 2005 to fourth quarter 2006. There may be a 5-month demolition period prior to the construction period. Once constructed, the project should have no operational impacts on cultural resources.

8.3.5 Cumulative Impacts

The largest group of industrial historical buildings remaining in the area is the Pier 70 Historical District, adjacent to the proposed project on the north. The City and Port of San Francisco are studying adaptive reuse of these structures as part of future development projects. Thus, these structures will likely be preserved as a result of future projects, rather than impacted. The other group of historic buildings in the area is the residential, commercial, and industrial buildings in the Dogpatch Neighborhood west of Third Street, which has been designated as a local historic district under Article 10 of the Planning Code. No specific projects proposed for this area are known, and future projects would be subject to review and approval under Article 10 of the Planning Code.

Impacts to subsurface archaeological resources from the proposed project and other projects in the vicinity could occur. However, project proponents for this and future projects in the area can mitigate impacts to as yet undiscovered subsurface archaeological sites by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP).

8.3.6 Mitigation Measures

The proposed project contemplates similar, but lesser, overall impacts to the project site and surrounding area than those envisioned in the Mirant Project. Importantly, the proposed project will preserve the Meter House and does not require demolition of the Pump House or the Gate House, both structures over 45 years old. The City will accept the mitigation measures proposed by CEC staff for Potrero 7 as revised to eliminate the need to move the Compressor House. Finally, the City remains open to discussing additional mitigation for cultural resources in the context of negotiating a community benefits package as discussed in Section 4, Environmental Justice. The City will seek community input on the level of limited funds for a community benefits package that should be devoted to cultural resources.

The City notes that in the CEC FSA for Potrero Unit 7, CEC staff recommended that, if feasible, the Meter House and Compressor House should be moved rather than demolished. However, their studies found that moving the buildings would not be possible. Thus, in hearings held on December 9, 2002, CEC staff testified that moving the two historic structures was not feasible. Staff, therefore, replaced the condition requiring that the

buildings be moved with a condition requiring production of a video "that documents the Meter House and the Compressor House and the role of those buildings in the gas manufacturing and distribution process in San Francisco."[12] In addition, City witnesses in the Potrero 7 case testified that moving the buildings would reduce their historic significance by taking them out of their original setting and thus did not constitute appropriate mitigation. Thus, the City does not propose to move the Compressor House or Station A. Instead, the City has focussed on preserving the Meter House.

Preservation and reuse of the Meter House will help mitigate the loss of the Compressor House and Station A by providing for retention of one of the remaining gas manufacturing buildings in the city. The City will aim to meet the Secretary of the Interior's *Standards for Treatment of Historic Properties*, to the extent feasible and cost-effective.

The Applicant also suggests that the same measures regarding archaeological resources be adopted for this project as Mirant proposed for the Potrero project. These were presented in the FSA for the Mirant AFC, and are quoted below:

> The potential for encountering eligible subsurface archaeological resources will be assessed by performing a test program using a bucket auger both in the power plant property and along the underground transmission line route. The Applicant has prepared a research design and testing plan to guide evaluation of any resources encountered during subsurface testing or construction. The plan provides research questions relevant to the kinds of buried archaeological resources that could be encountered and provides guidelines for making decisions about CRHR eligibility. This plan will expedite the evaluation process, especially for resources encountered during construction.
>
> Staff also recommends construction monitoring for both the power plant and underground transmission cable. Adoption of staff's proposed conditions of certification will reduce the potential for adverse project impacts on subsurface cultural resources to a less than significant level, but may not reduce the impacts on above ground eligible historical resources to a less than a significant level.

The proposed project contemplates similar, but lesser, overall impacts to the project site and surrounding area than those envisioned in the Mirant Project. The footprint of the proposed SFERP is smaller than that proposed for Mirant's Potrero project and the linear for the SFERP (water supply pipeline) is shorter than Mirant's underground transmission route.

Construction monitoring by a qualified archaeologist is recommended for any subsurface construction at the plant site and along the water supply pipeline corridor. Monitoring of the laydown site is not recommended because there will be no subsurface disturbance of the laydown site. If archaeological material is observed by the monitoring archaeologist, ground disturbing activity should be halted in the vicinity of the find so that its significance (CRHR

[12] See testimony of Gary Reinhohl, CEC Cultural Resources Planner, in "Evidentiary Hearing Before the California Energy Resources Conservation and Development Commission, In the Matter of: Application for Certification, Mirant Corporation's Potrero Power Plant Unit 7 Project, Docket No. 00-AFC-4." December 9, 2002. Pages 39-43 cover the feasibility of moving the two buildings and the new condition of certification.

eligibility) can be determined. If evaluated as significant, mitigation measures (avoidance or data recovery) should be developed in consultation with the CEC. A worker education program is recommended to ensure that buried archaeological resources are recognized by construction crews. Such a program should include information about the kinds of archaeological material that could be encountered and the procedures to be followed if such material is discovered. It is recommended here that previous conditions of certification for archaeological resources presented by Reinoehl and Mason (2002) for the Mirant project would be applicable for the SFERP project with appropriate modifications to suit the SFERP project.

8.3.7 Involved Agencies and Agency Contacts

Table 8.3-2 provides a list of agencies and contact persons of potentially responsible agencies.

TABLE 8.3-2
Agencies and Agency Contacts for SFERP Cultural Resources

Agency	Contact/Title	Phone Number	Address
NAHC	Larry Myers, Executive Secretary	916-653-4082	915 Capitol Mall, Sacramento

8.3.8 Permits and Permitting Schedule

Permits dealing with the effects on cultural resources are addressed as part of the building permit process.

8.3.9 References

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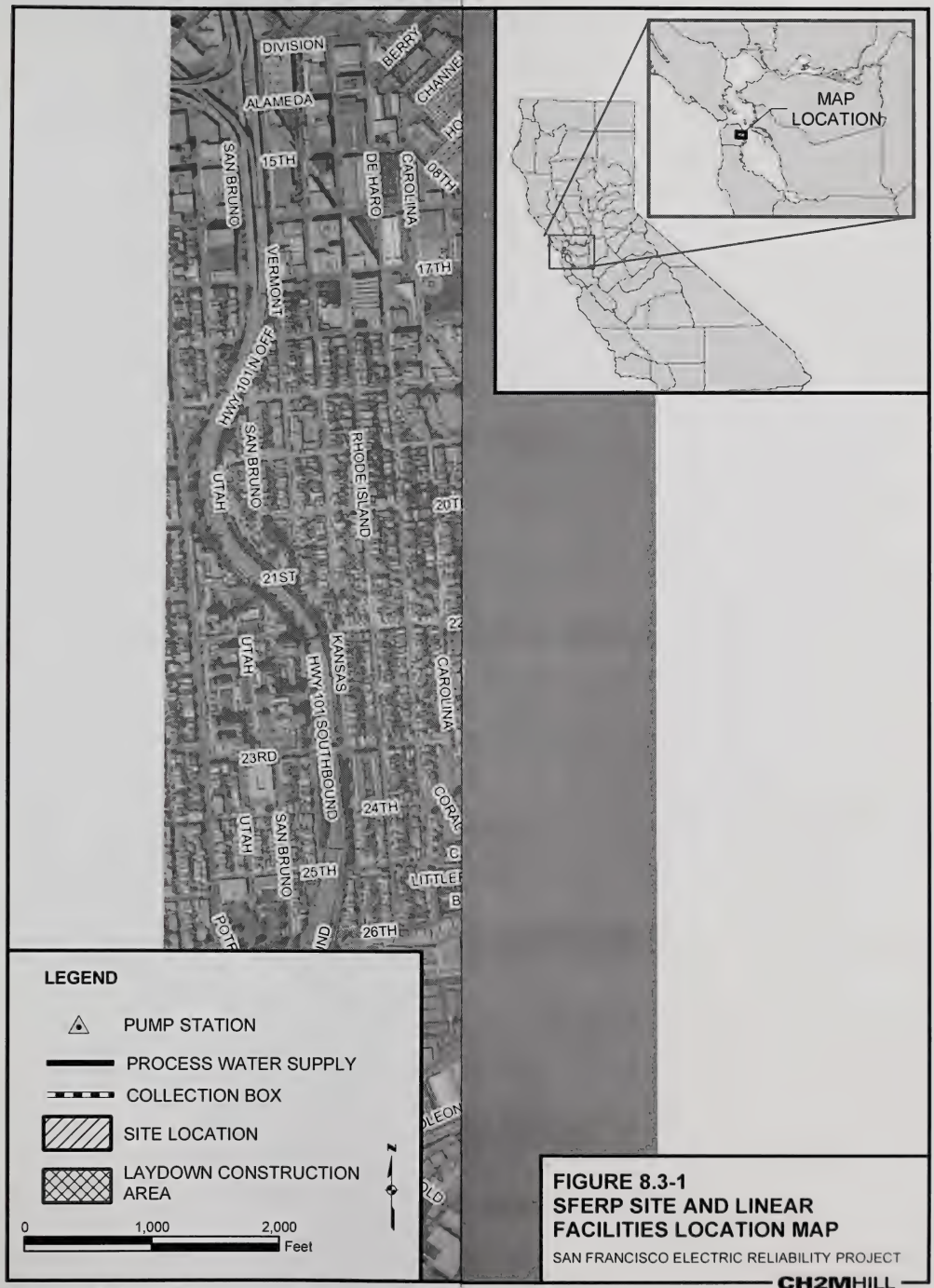


FIGURE 8.3-1
SFERP SITE AND LINEAR FACILITIES LOCATION MAP

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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FIGURE 8.3-1
SFERP SITE AND LINEAR FACILITIES LOCATION MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SUBSECTION 8.4

Land Use

8.4 Land Use

8.4.1 Introduction

This section provides an inventory of existing and planned land uses in the vicinity of the proposed SFERP facilities. For purposes of this analysis, the affected environment (study area) is defined as those areas within one mile of the proposed SFERP site and within one-quarter mile of the proposed offsite linear facilities. The overview of the project's affected environment includes a description of existing land uses and zoning districts in the project study area. An analysis of the potential impacts on land uses surrounding the proposed project is provided. This section also evaluates the project's consistency with land use plans and policies, including adopted local, regional, state and federal plans applicable to the proposed project.

Land use trends identified for the study area are based on current land use plans and approved development projects. Reasonably foreseeable future development projects are assessed for potential cumulative land use impact. Where appropriate, mitigation measures are proposed to reduce potential project-related land use impacts to acceptable levels.

Land use impacts associated with the proposed SFERP are identified and evaluated based on:

- Site reconnaissance surveys
- A review of current U.S. Geological Survey (USGS) 7.5-minute topographic (i.e., quadrangle) maps
- Aerial photography
- A review of local land use ordinances
- A review of the land use goals and policies identified in the San Francisco General Plan and associated Area Plans and maps
- Future land use development trends (e.g., San Francisco housing initiative, draft of The Central Waterfront Neighborhood Plan)
- Discussions with City Planners

Other local plans reviewed for this assessment include plans adopted by the Bay Conservation and Development Commission (BCDC), the Port of San Francisco, and the Metropolitan Transportation Commission (MTC).

8.4.2 Affected Environment

The affected environment of the project is defined in accordance with the requirements of the CEC. As noted above, the affected land use environment/study area includes, but is not limited to, the area within a one-mile radius of the proposed SFERP facilities and one-quarter mile surrounding the proposed effluent pipeline. Government agencies with land use jurisdiction in the study area include the City, the San Francisco Redevelopment

Agency, BCDC, and the Port of San Francisco. Figure 8.4-1 shows jurisdictional boundaries within the project study area.

8.4.2.1 Regional Setting

San Francisco County is one of nine counties that comprise the San Francisco Bay Area. The City and County of San Francisco (CCSF) are contiguous jurisdictions encompassing an area approximately 8 miles across from east to west and 5 to 7 miles across from north to south. Surrounding counties include Marin to the north, Alameda to the east, and San Mateo to the south. The Pacific Ocean and San Francisco Bay bound San Francisco to the north, east and west. Most of San Francisco is heavily urbanized, with small pockets of open space areas preserved as parks.

The project is situated within Potrero Point along the eastern shoreline of the San Francisco Bay between Central Basin in the north and Islais Creek Channel in the south. This area is referred to as the Central Waterfront and is dominated by industrial land uses. Residential and commercial uses are located west of an industrial band of land uses along the waterfront. Pacific Bell Park is located approximately 1.5 miles north of the SFERP site, and the Hunters Point Power Plant is approximately 1.8 miles to the south.

8.4.2.2 Existing Land Uses and Zoning

The proposed SFERP site encompasses approximately 4.5 acres within the existing Potrero Power Plant (Potrero PP) site. Potrero PP is located on the eastern shore of the San Francisco Bay, and is bounded to the north by Humboldt Street, to the south by 23rd Street, and to the west by Illinois Street. The SFERP site is located on the western portion of the Potrero PP site, immediately east of the existing PG&E 115kV Potrero electrical substation. The City is currently in negotiations with Mirant for an option to purchase the property.

As shown on Figure 8.4-2, existing land uses within the study area include primarily industrial, commercial, and residential uses. Additional uses include parks/open space and institutional uses such as schools, churches and libraries. Zoning districts in the study area are shown on Figure 8.4-3, and generally correlate to existing land uses. A description of the study area zoning districts is provided on Table 8.4-1. The project site falls within the Heavy Industry (M-2) zoning district.

TABLE 8.4-1
Zoning Districts Within the Study Area

Zoning District	Description*
Heavy Industry (M-2)	Areas suitable for heavy industrial uses. Uses in the "M-2" District limited primarily to larger industries dependent upon rail and water transportation and by large utility lines. Allowable uses include manufacturing, wholesale, storage, retail, repair, and service uses. Permitted uses include utility installations and steam power plants. Residential uses are conditional uses requiring authorization by the Planning Commission.
Light Industry (M-1)	Areas suitable for light industrial uses. Uses in the "M-1" District are primarily limited to industrial smaller industrial uses dependent upon truck traffic. Allowable uses include manufacturing, wholesale, storage, retail, repair, and service uses. Residential uses are conditional uses requiring authorization by the Planning Commission.

TABLE 8.4-1
Zoning Districts Within the Study Area

Zoning District	Description*
Small-Scale Neighborhood Commercial (NC-2)	Areas suitable for neighborhood-oriented commercial services. Allowable uses include retail sales and services, and medical professional, and business services. Other uses, including residential, are conditional uses requiring authorization by the Planning Commission.
Public Use District (P)	Applies to land owned by a governmental agency and that is in some form of public use, including open space. Permitted uses include structures and uses of the City subject to certain restrictions, and to structures and uses of other governmental agencies not subject to regulation by the Planning Code.
Residential, House Districts, One-Family (RH-1)	Areas suitable for residential areas. Primary uses include 1 detached residential unit per lot, plus residential care and child care facilities, some open space, and non-industrial public space. Additional uses consistent with residential uses are conditional uses requiring authorization by the Planning Commission.
Residential, House Districts, Two-Family (RH-2)	Areas suitable for residential areas. Primary uses include 2 detached residential units per lot, plus residential care and child care facilities, some open space, and non-industrial public space. Additional uses consistent with residential uses are conditional uses requiring authorization by the Planning Commission.
Residential, House Districts, Three-Family (RH-3)	Areas suitable for residential areas. Primary uses include 3 detached residential units per lot, plus residential care and child care facilities, some open space, and non-industrial public space. Additional uses consistent with residential uses are conditional uses requiring authorization by the Planning Commission.

Source: CCSF, 1999.

* Reference to "compatible" uses within the descriptions is based on the zoning requirements.

Industrial and commercial land uses surround the project site to the north, south, and west (see Figure 8.4-2). Commercial and industrial operations in the nearby vicinity of the SFERP site include shipping piers and dry dock facilities along the waterfront, vehicle storage and impoundment yards to the north, gas stations, warehouses, factories and small commercial business to the west, a railroad yard and trucking companies to the south.

The nearest residential development to the SFERP is located approximately 600 feet to the west of the project site. Recent development within the study area includes 63 new housing units located primarily west of Third Street and a significant commercial structure at Cesar Chavez Street and Third Street (Rubin, 2003). A small inlet referred to as Warm Water Cove is located adjacent to the south side of Potrero PP. Islais Creek is located approximately 3,500 feet south of the SFERP site. There are no agricultural land uses within the affected environment.

8.4.2.3 Potentially Sensitive Land Uses

Potentially sensitive land uses in the study area include schools, parks, churches, libraries and residences. Residential development is located approximately 600 feet west of the project site on Third Street. A church is located immediately north of these residences. Two pockets of residential development are also located west of the SFERP site along Tennessee Street. The nearest recreational use is Warm Water Cove, located immediately southeast of the Potrero PP. These uses represent sensitive land uses within one-quarter mile of the SFERP site. Sensitive land uses in the SFERP study area are listed on Table 8.4-2 and include

three schools, five churches, five parks, and a library. A map of these land uses is provided in Subsection 8.6, Public Health, as Figure 8.6-1.

TABLE 8.4-2
Potentially Sensitive Land Uses within the Affected Area

Land Use[a]	Approximate Distance from Proposed Project Site[b]
Warm Water Cove Park	Adjacent to south side of Potrero PP site
St. Stephen Baptist Church	200 yards
Daniel Webster Elementary	800 yards
Aqua Vista Park and Public Viewing Area	800 yards
Potrero Hill Recreation Center (Park)	900 yards
St. Teresa's Church	900 yards
Potrero Library	1,000 yards
Islais Creek Channel (Park)	1,000 yards
First Russian Christian Church	1,200 yards
King Starr Elementary	1,200 yards
Jackson Playground (Park)	1,200 yards
Potrero Hill Middle School	1,300 yards
Hillside Baptist Church	1,400 yards
City View Church	1,400 yards

Notes:
[a] Does not include residential land uses (refer to Figure 8.4-2).
[b] The affected environment consists of the area within one mile (1,760 yards) of the generating plant site and within a quarter-mile (440 yards) of linear facilities.

Sensitive land uses can also include cultural and historical sites as well as natural scenic areas. See Subsection 8.3, Cultural Resources and Subsection 8.11, Visual Resources for assessments of these environmental areas.

8.4.2.4 Land Use Plans and Policies

The project site is located within the City of San Francisco. Land use plans adopted by San Francisco and applicable to the proposed project include the General Plan, the Central Waterfront Area Plan, and the South Bayshore Area Plan. The Central Waterfront Neighborhood Plan includes the SFERP project site and approximately 500 acres surrounding the project site. A draft of this plan was distributed for public review in January 2003, but has not been adopted by the City.

The following plans do not directly apply to the project site, but apply to land uses within the project study area:

- Port of San Francisco Waterfront Land Use Plan
- Port of San Francisco Waterfront Design and Access Plan
- San Francisco Bay Plan (by BCDC)

- San Francisco Bay Area Seaport Plan (by MTC and BCDC)

Land use plans applicable to the proposed SFERP are discussed in the sections that follow. Specific goals, policies, or objectives applicable to the SFERP are discussed under Subsection 8.4.3 (Laws, Ordinance, Regulations, and Standards) and summarized on Table 8.4-3.

TABLE 8.4-3
Land Use Plans and Policies Related to the Proposed Project

Authority Category	Policy*
San Francisco General Plan Commerce and Industry, Environmental Protection, Urban Design and Air Quality Elements	
Environmental Protection	Assure that all new development meets strict environmental quality standards and recognizes human needs.
	Promote the use and development of shoreline areas consistent with the Comprehensive Plan and the best interest of San Francisco.
	Comply with objectives, policies, and air quality standards of the Bay Area Air Quality Management District.
Growth	Encourage development that provides substantial net benefits and minimizes undesirable consequences.
	Locate commercial and industrial activities according to a generalized Commercial and Industrial Density Plan map.
Open Space	Assure that new development adjacent to the shoreline capitalizes on its unique waterfront location, considers shoreline land use provisions, improves visual and physical access to the water, and conforms with urban design policies.
Urban Design	Promote harmony on the visual relationships and transitions between new and older buildings.
	Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.
Community Safety	Assure that new construction meets current structural and life safety standards.
	Consider information about geologic hazards whenever City decisions that will influence land use, building density, building configurations or infrastructure are made.
Central Waterfront Area Plan	
Land Use	Encourage the intensification and expansion of industrial uses. (Policy 1).
	Prevent the conversion of land needed for industrial activity to non-industrial use (Policy 2).
	Assure that the adverse environmental impacts of new development are fully mitigated (Policy 3).
Industry	Promote industrial expansion through maximizing and intensifying the use of existing facilities and properties (Policy 1).
Central Basin Subarea	Assure that any power plant expansion on the Potrero PP site will provide additional employment and will not adversely affect the environment (Objective 16, Policy 2).

TABLE 8.4-3
Land Use Plans and Policies Related to the Proposed Project

Authority Category	Policy*
South Bayshore Area Plan	
Land Use	Restrict industrial activities with significant environmental hazards from locating adjacent to or nearby existing residential areas (Policy 1.2).
	Encourage a wider variety of light industrial uses in South Basin by more efficient use of industrial space (Policy 1.5).
Open Space	Maintain the quality of existing shoreline open space (Policy 13.2).
	Provide new public open spaces along the shoreline—at Islais Creek and India Basin (Policy 13.4).
Industry	Maintain industrial zones in the Northern Industrial Sub-district (Policy 8.1).

Sources: CCSF, 1988, 1997, and 1998;
Note:
* Plans and policies are summarized as relevant to the SFERP project.

8.4.2.4.1 General Plan. The San Francisco General Plan identifies goals and policies regarding industrial development, and contains a more detailed area plan for the Central Waterfront that encompasses the SFERP site. The General Plan includes specific policies to preserve and enhance existing development and to provide for orderly and appropriate new development to meet the needs of the area over the coming years (CCSF, 1996). The General Plan includes the following elements:

- Air quality
- Arts
- Commerce and Industry
- Community facilities
- Community safety
- Environmental protection
- Recreation and open space
- Residence
- Transportation
- Urban design

Each element contains goals, policies, and implementation measures pertinent to proposed developments at the project site and within the project study area. Those applicable to the SFERP are summarized in Table 8.4-3.

8.4.2.4.2 Central Waterfront Area Plan. The Central Waterfront Area Plan is a component of the General Plan and provides additional goals and policies applicable to the project site and study area. The plan encompasses approximately 900 acres or 1.4 square miles of eastern San Francisco shoreline between China Basin in the north, Islais Creek in the south, and adjacent inland areas. The existing Potrero PP and SFERP are located in the Central Basin Subarea of the Central Waterfront Area Plan.

The goal of this plan is to reverse the pattern of economic decline in the area by promoting land use objectives to retain and expand industrial and maritime activities. In addition, the

plan promotes ancillary development, such as residential, recreational, commercial, and public service infrastructure, that are aligned with the industrial and maritime development goal. Conversely, it discourages developments that do not support the industrial and maritime development goal. Objective 16, Policy 16.2 of the Central Basin Subarea specifically aims to assure that any power plant expansion on the Potrero PP site will: 1) provide additional employment, and 2) will not adversely affect the environment. Additional planning policies applicable to the SFERP are summarized in Table 8.4-3.

8.4.2.4.3 South Bayshore Area Plan. This plan is a tool for residents and the City to guide the future development of the South Bayshore district of San Francisco, which includes the area south of Ceasar Chavez Boulevard and east of Highway 101. South Bayshore, commonly known as Bayview Hunters Point, is a predominantly industrial and residential district. The plan includes policies and objectives related to Land Use, Transportation, Housing, Commerce, Industry, Recreation and Open Space, Urban Design, Community Facilities and Services, and Public Safety. The proposed process water pump station and a portion of the proposed process water pipeline to the SFERP are located within the Northern Industrial Sub-district of the South Bayshore Area Plan.

The principal objectives for land use in the South Bayshore are to "achieve favorable balance among residential, industrial, commercial and open space uses; stimulate development in underused and declining areas; protect low scale physical character; and increase pedestrian-oriented neighborhood commercial and social activities." Other policies and objectives of the South Bayshore Area Plan applicable to the project site and study area are provided on Table 8.4-3.

8.4.2.4.4 Central Waterfront Neighborhood Plan (Draft for Public Review). The draft Central Waterfront Neighborhood Plan (CCSF, 2003) encompasses approximately 350 acres along San Francisco's eastern shoreline, and includes the project site. The planning area is bounded to the north by Mariposa Street, to the west by Interstate 280 (I-280), to the south by Islais Creek and to the east by San Francisco Bay. The draft plan was released for public review and comment in January 2003 and has not been formerly adopted by the City.

The plan includes an objective to "Strengthen and expand the Central Waterfront as a residential, mixed use neighborhood." Policy 2.11 of the plan acknowledges that the area adjacent to the existing power plant is not compatible with residential development and would prohibit residential development adjacent to the power plant, if adopted. The plan recognizes the potential for additional housing east of Illinois Street (i.e., at and in the near vicinity of the project site), but recognizes the conflict that would occur due to existing industrial operations at the Potrero PP site. The Central Waterfront Neighborhood Plan notes the significant potential for residential development in this area should operations at the Potrero PP site cease.

8.4.3 Laws, Ordinances, Regulations, and Standards

A summary of the applicable laws, ordinances, regulations, plans, and standards related to land use at the project site and vicinity are summarized below.

8.4.3.1 Federal

No federal LORS for land use apply to the site or project.

8.4.3.2 State

The Application for Certification (AFC) process under the Warren-Alquist Act has been determined to be California Environmental Quality Act (CEQA)-equivalent. It thus fulfills the requirements of CEQA. CEQA is codified in the California Public Resources Code, Sections 21000-21178.1. Guidelines for implementation of CEQA are codified in the California Code of Regulations (CCR) Sections 15000-15387.

8.4.3.3 Local

At the local level, pertinent regulations involve primarily land use policies, zoning requirements, and building and grading standards. In addition, various resolutions and ordinances enacted by the San Francisco Board of Supervisors and Planning Commission are applicable to the proposed SFERP.

8.4.3.3.1 Planning Policies. The San Francisco General Plan and Area Plan policies applicable to the proposed project are listed in Table 8.4-3. In summary, these policies strive to maintain or enhance the quality of life for San Francisco residents while providing the needed services and minimizing potentially associated negative effects. Zoning and other regulations and actions must be consistent with planning policies and goals outlined in the General Plan and Area Plans.

8.4.3.3.2 Resolutions, Ordinances, and Related Permits. Implementation of the General Plan occurs primarily via the San Francisco Planning Code and Zoning Maps. The Planning Code provides detailed specifications for allowable development (e.g., density, lot size, height, setback). The zoning maps delineate the various zones. The project site is located in an area zoned M-2, which provides for heavy industrial uses. Steam power plants and utility installations are permitted uses in areas zoned Heavy Industry, provided that operating requirements necessitate location within that district (CCSF, 1999).

In addition to regulating land use types, the San Francisco Planning Code also regulates the intensity of development in each zoning district. A floor area ratio (FAR) of 5.0 to 1 is permitted in zones designated Heavy Industry. The project site is in a 40-X height and bulk district. This allows structures to be built to a height of 40 feet and with an unlimited bulk. Section 260(b) of the Planning Code exempts structures and equipment necessary for industrial plants and public utilities where such structures and equipment do not contain separate floors (CCSF, 1999).

Other regulations governing development include the ordinances and resolutions enacted by the San Francisco Board of Supervisors and Planning Commission. The applicable ordinances and resolutions are summarized below in Table 8.4-4.

TABLE 8.4-4
Applicable Land Use Laws, Ordinances, Regulations, and Standards

Jurisdiction	AFC Section	Authority	Administering Agency	Requirements and Compliance
Federal	8.4.3.1	None applicable		
State	8.4.6.3.2	Cal Pub. Res. Code § 25523(a); 20 CCR §§ 1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Appendix B, Part (i)(3) and (4).	CEC	Evaluate compatibility of the proposed project with relevant land use plans.
	8.4.7	California Environmental Quality Act (CEQA), Pub. Res. Code §§ 21000-21177	CEC	Appropriate mitigation measures for potential environmental impacts.
Local	8.4.6.3.1 8.4.6.3.2	General Plan	San Francisco Department of Planning	Compliance with goals and policies, and specific zoning requirements.
Local	8.4.6.3.1 8.4.6.3.2	Central Waterfront Area Plan	San Francisco Department of Planning	Consistent with goals and policies.
Local	8.4.8	Public Works Code, Articles 2.44, 18	San Francisco Department of Public Works Bureau Of Street-Use and Mapping	A Minor Encroachment Permit will be obtained for shoring during construction; a Street Improvement Permit will be obtained for repairs following excavation.
Local	8.4.6.3.2	San Francisco Charter Section 4.105 and Administrative Code Section 2A.53 (General Plan Referrals)	San Francisco Planning Department and Board of Supervisors	Requires a General Plan conformity review from the Planning Department for projects involving the acquisition of property by the City. Projects found to be inconsistent with the General Plan cannot be approved by the Board of Supervisors without a two-thirds majority.
Local	8.4.6.3.2	Resolution 16202 (Establishing Policies and Procedures for Development Proposals in Industrial Zoning Districts)	San Francisco Planning Department and Planning Commission	Establishes policies and procedures for an industrial protection zone and a housing zone, which will be considered during the Planning Commission's discretionary review of the SFERP.
Local	8.4.6.3.2	Unreinforced Masonry Buildings (UMB) Building Code, chapters 16B and 16C.	San Francisco Planning Department	An owner is required to either structurally alter or demolish masonry buildings that do not meet code. The SFERP would demolish two existing masonry buildings and would retrofit another to meet code.
Industry		None applicable.		

8.4.4 Land Use Trends

According to the Association of Bay Area Governments (ABAG), San Francisco's population is expected to increase by an estimated one percent between 2000 and 2020 (ABAG, 2000). In particular, the population of eastern San Francisco is expected to increase during this period due to availability of additional housing units anticipated in the Mission Bay and Hunters Point Redevelopment areas (Lee, 2000). Additional planned development in eastern San Francisco includes the Rincon Point/South Beach Redevelopment project. These redevelopment projects are not located within the SFERP study area.

On March 2, 2004, the citizens of San Francisco rejected a ballot initiative (Proposition J) that would have: 1) allowed for the construction of up to 10,000 residential units in downtown San Francisco and the Central Waterfront area; and 2) required the San Francisco Planning Department to ensure that there is sufficient land for at least 5,000 additional housing units in the Central Waterfront area. Although Proposition J was defeated, it is evidence of significant interest by some policy makers to facilitate additional affordable residential housing in the City with a particular focus on the Central Waterfront area.

8.4.5 Recent Discretionary Reviews

Based on communication with the San Francisco Planning staff (Rubin, 2003), applications for 281 housing units have been recently approved or are pending approval. Figure 8.4-4 shows those housing units within the study area. Development is currently being planned at Pier 70 by the Port of San Francisco. The goal of this plan is to rehabilitate and adaptively use the existing historic buildings onsite. The Port intends to provide public-oriented uses at Pier 70, anchored by an institutional tenant such as a government agency or non-profit organization (Paez, 2004).

8.4.6 Environmental Consequences

This section discusses the environmental consequences of the proposed SFERP related to land use impacts within the project study area. The potential environmental consequences concern both the construction and the operation of the power plant and associated linear facilities.

8.4.6.1 Significance Criteria

Significance criteria for impacts to land use were determined through review of applicable State and local regulations. Because the Warren-Alquist Act is equivalent to a CEQA review, the following criteria developed from the CEQA Guidelines and the CEQA Checklist were used to evaluate the potential environmental impacts of the project:

- Will the project physically divide an established community?
- Will the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?
- Will the project conflict with any applicable habitat conservation plan or natural community conservation plan?

- Will the project result in noise and odor nuisances that will cause existing land uses to cease or be adversely affected, or inhibit the development of future planned land uses?
- Will the project generate traffic problems that will restrict access, adversely affecting land uses?

8.4.6.2 Construction Impacts

Construction activities at the SFERP site will be designed so that an interruption of existing electrical generation and transmission activities would be avoided. No impact to land uses internal to the Potrero PP site would result. Construction of the SFERP will occur adjacent to commercial and industrial land uses. Due to the nature of operations at these adjacent uses, no impact to adjacent land uses is expected to occur during construction.

Construction activities would result in noise, dust, equipment exhaust emissions, and other nuisances that could affect sensitive land uses in the study area. However, given the distance between the project site and the nearest sensitive land uses, these impacts would be sufficiently buffered such that existing activities would not be substantially interrupted. Moreover, the City will implement dust reduction methods as discussed in Subsection 8.6, Public Health. Finally, the impact from noise, dust, and exhaust emissions would be temporary. Therefore, sensitive land uses within the project study area would not be significantly impact by project construction activities. Additional detail regarding potential noise and air quality impacts during construction activities is provided in Subsection 8.1, Air Quality and Subsection 8.5, Noise.

Material and equipment staging areas will be required during the construction period, which will serve as base stations for employees, field office locations, lay down areas as well as the storage of materials, equipment, and vehicles. Construction staging is proposed on an approximately 10-acre site located southeast of the project site, between 25th Street and Cesar Chavez Street and Water Front Street and Georgia Street (see Figure 8.4-1). This site is vacant and is surrounded by industrial land uses; construction-related activities at the staging area are not expected to impact these uses.

The delivery of construction materials and equipment, and transport of personnel will generate traffic that could temporarily impede access to study area land uses. Based on the anticipated volume of construction traffic (refer to Subsection 8.11, Traffic and Transportation), access to surrounding land uses would be maintained such that existing activities and operations would be uninterrupted or substantially maintained. Therefore, no significant land use impact would result from construction-related traffic.

Construction of the project's linear facilities (process water pipeline) will require excavating portions of local roadways, and could temporarily restrict vehicle and pedestrian access to adjacent land uses. If necessary, detours and alternate routes would be provided to maintain access to study area land uses. These issues would be addressed as a component of the project's traffic management plan. Any restriction of access to existing land uses would be temporary, and would not result in a significant impact to adjacent land uses. Traffic impacts associated with construction activities are assessed in detail under Subsection 8.11, Traffic and Transportation.

8.4.6.3 Operational Impacts

The SFERP facilities are sited within an area dedicated to heavy industrial uses that include electrical generation facilities and a 115 kV electrical substation. The proposed SFERP facilities are sited on a 4.5-acre parcel, and would not impact operation of the existing facilities at the Potrero PP site. Selection of the SFERP site at Potrero PP was due in part to the existing electrical transmission infrastructure available at the site and compatibility with surrounding industrial and electric utility land uses.

Potential conflicts and compatibility impacts with existing and proposed land uses in the study area are discussed below, followed by an assessment of the project's consistency with land use plans, policies and regulations.

8.4.6.3.1 Compatibility with Existing and Proposed Land Uses. The nearest residences to the project site are located approximately 600 feet to the west. Therefore, the project would not physically divide an established community. The project would constitute industrial development on land that is zoned for heavy industrial use by the City. Both the General Plan and the Central Waterfront Area Plan indicate that power plants are compatible adjacent land uses to other heavy industrial activities along the Central Waterfront.

Based on the scale of the proposed facilities, the existing operational characteristics of the site would not be substantially altered by the SFERP. That is, subsequent to implementation of the SFERP, noise, odors, traffic, and the visual character of the Potrero PP site would be similar to existing conditions. Because the operational characteristics of the project site would be predominantly unchanged by SFERP operations, potential adverse impacts to surrounding land uses (including residential and other sensitive uses) are not expected to be significant. Nonetheless, implementation of the SFERP would intensify the existing industrial operations at the Potrero PP site, and would increase the potential for conflict with surrounding residential and other sensitive land uses.

In the recent past, an increasing number of new residential units have been approved for development and/or constructed within the Central Waterfront area. As noted previously, applications for 281 housing units have been recently approved or are pending approval (see Figure 8.4-4, for those near the project site. The intensification of industrial operations at the Potrero site resulting from implementation of the SFERP has the potential to conflict with planned residential development. However, the existing land use characteristics of the project site would not be substantially altered by project operations.

Future changes to San Francisco housing policy (such as those envisioned under the Central Waterfront Neighborhood Plan) could result in an increase in the intensity of residential development in the project vicinity. Implementing such changes may require formal modification of zoning and/or land use plans affecting the study area. These modifications would respond to the existing industrial characteristics at the Potrero PP site and, if implemented, those associated with the SFERP.

Development of the SFERP facilities would not alter access to surrounding land uses, including open space areas that provide public access to the San Francisco Bay. Warm Water Cove and Islais Creek would continue to provide public access and recreational opportunities.

The effluent pipeline alignment occurs within predominantly commercial and industrial land uses. Because this facility will be located sub-surface, project operations will have no effect on surrounding land uses. The associated pump station would not interfere with adjacent commercial and industrial operations.

8.4.6.3.2 Consistency with Existing Land Use Plans, Policies, and Regulations. The proposed project is consistent with applicable land use policies established in the General Plan and applicable Area Plans. Implementation of the SFERP is consistent with the General Plan policies related to growth in that it will result in a net benefit to the citizens of San Francisco by enhancing energy reliability with a relatively clean new energy source.

Applicable policies of the Central Waterfront Area Plan noted on Table 8.4-3 relate to: expanding and protecting existing industrial uses, mitigating adverse environmental impacts of new development, and assuring that expansion of the Potrero PP site provides additional employment. The SFERP would intensify existing electrical generation operations at the Potrero PP site, and preclude the conversion of industrial land to non-industrial uses. The project will comply with applicable regulatory requirements to ensure that public health and safety is preserved (see Subsection 8.6, Public Heath and Subsection 8.7, Worker Health and Safety). Mitigation measures to avoid or minimize environmental effects of the SFERP are described throughout this document for each discipline. Thus, the proposed SFERP is considered consistent with all applicable goals and policies of the Central Waterfront Area Plan.

Project elements within the boundaries of the South Bayshore Area Plan are limited to subsurface facilities, with the exception of the effluent pumping station. This facility is proposed within the Northern Industrial sub-district, and operation would not conflict with any of the South Bayshore Area Plan planning policies.

The zoning designation at the proposed project site is Heavy Industry (M-2). Utility installations are a permitted use in the M-2 District under Section 227(e) of the Planning Code, provided that operating requirements necessitate location within the district. The SFERP is sited immediately adjacent to existing electric transmission and substation facilities, which are required ancillary facilities to operate the SFERP. The Planning Code indicates a 40-foot height limitation on structures; however, unoccupied structures necessary for industrial facilities or public utilities are exempt from the height restrictions. Therefore, development of the SFERP facilities conforms to the zoning and planning code requirements applicable to the project site.

The project's effluent pipeline alignment and pump station also fall within an area zoned for heavy industry (refer to Figure 8.4-3). Utility installations are permitted areas zoned Heavy Industry, provided that operating requirements necessitate location within that district (CCSF, 1999). The pipeline line is required by the proposed project, and is therefore, a permitted use.

Resolution 16202 of the San Francisco Planning Commission sets forth additional guides for development proposals in areas including the Central Waterfront. The Commission provides as one of the reasons for this policy: "[a]dditional policy direction from the Planning Commission is necessary to protect and preserve the City's diminishing supply of industrially zoned land and building space, and to alleviate the threat to that limited supply of industrially zoned land and building space caused by office development in certain industrially zoned areas. It establishes "industrial protection zones" to protect diminishing

industrial land uses along Third Street and north of 24th Street, and a "housing zone" encompassing the Potrero PP site, in which mixed-use housing is encouraged. The SFERP is located in the "housing zone." Nonetheless, Resolution 16202 does not preclude industrial development in the housing zone.

Unreinforced Masonry Buildings (UMB) San Francisco Building Code, Chapters 16B and 16C requires an owner to either structurally alter or demolish masonry buildings that do not meet current building code. The SFERP may include demolition of two of the three existing masonry buildings at the project site, and would retain one of the masonry structures (see Subsection 8.3, Cultural Resources), which would be rehabilitated to meet current code. As such, the project would be consistent with the UMB requirements.

8.4.6 Cumulative Impacts

The CEQA Guidelines (Section 15355) define cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." The CEQA Guidelines further note that "[t]he cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time."

As noted above, recently completed "cumulative projects" within the study area include the construction of 63 new housing units and a significant new commercial structure at Ceasar Chavez Street and Third Street. Present and foreseeable projects include the 281 additional housing units that have either been approved or are pending approval and a large mixed-use development planned at Pier 70. No other commercial electrical generation projects are planned or proposed within the project study area.

Land use impacts are typically limited to a project site and nearby vicinity. Cumulative land use impacts can result from multiple concurrent projects within in close proximity. Relative to the study area size and density, the amount and type of cumulative projects noted above are not substantial. Further, the SFERP is consistent with applicable zoning and land use policies, and is considered compatible with adjacent and nearby land uses, including sensitive land uses. Given the minimal land use impact anticipated from the SFERP, the local nature of land use impacts in general, and the amount and type of cumulative projects, significant cumulative land use impacts are not anticipated to result from SFERP implementation.

8.4.7 Mitigation Measures

No significant land use impacts are anticipated from implementation of the SFERP. Therefore, no mitigation measures are proposed. However, project implementation will require demonstration of conformity to the LORS, and applicable permits noted below in Subsection 8.4.8. Project implementation will also be subject to City planning regulations, as follows:

> Prior to the commencement of construction activities, a site plan will be prepared and submitted to the City for review and comment, and to the CEC Compliance Project Manager for review and approval. The site plan will comply with all applicable provisions of the San Francisco Planning Code, including, but not limited to, Chapters 1.2, 1.5, 2.0, and 2.5.

8.4.8 Permits Required and Permit Schedule

Table 8.4-5 summarizes the required permits and anticipated schedule.

TABLE 8.4-5
Permits Required and Permit Schedule

Responsible Agency	Permit/Approval	Schedule
San Francisco Department of Public Works, Bureau of Street-Use and Mapping	Minor Encroachment Permit (for shoring during construction) and Street Improvement Permit (for repairs following excavation)	60-90 days
San Francisco Planning Department	Building Permit	60-90 days

8.4.9 Involved Agencies and Agency Contacts

Table 8.4-6 lists the agency contact names and phone numbers.

TABLE 8.4-6
Involved Agencies and Agency Contacts

Agency	Contact/Title	Telephone
San Francisco Department of Planning 1660 Mission Street San Francisco, CA 94103	Gerald Green, AICP Director	(415) 558-6411
San Francisco Department of Public Works Bureau of Street-Use and Mapping 30 Van Ness Avenue, 5th Floor San Francisco, CA 94102	John Kang Director of Permits	(415) 554-6209
Port of San Francisco Pier 1 Port of San Francisco San Francisco, CA 94111	Ken Winters Director of Real Estate	(415) 274-0400

8.4.10 References

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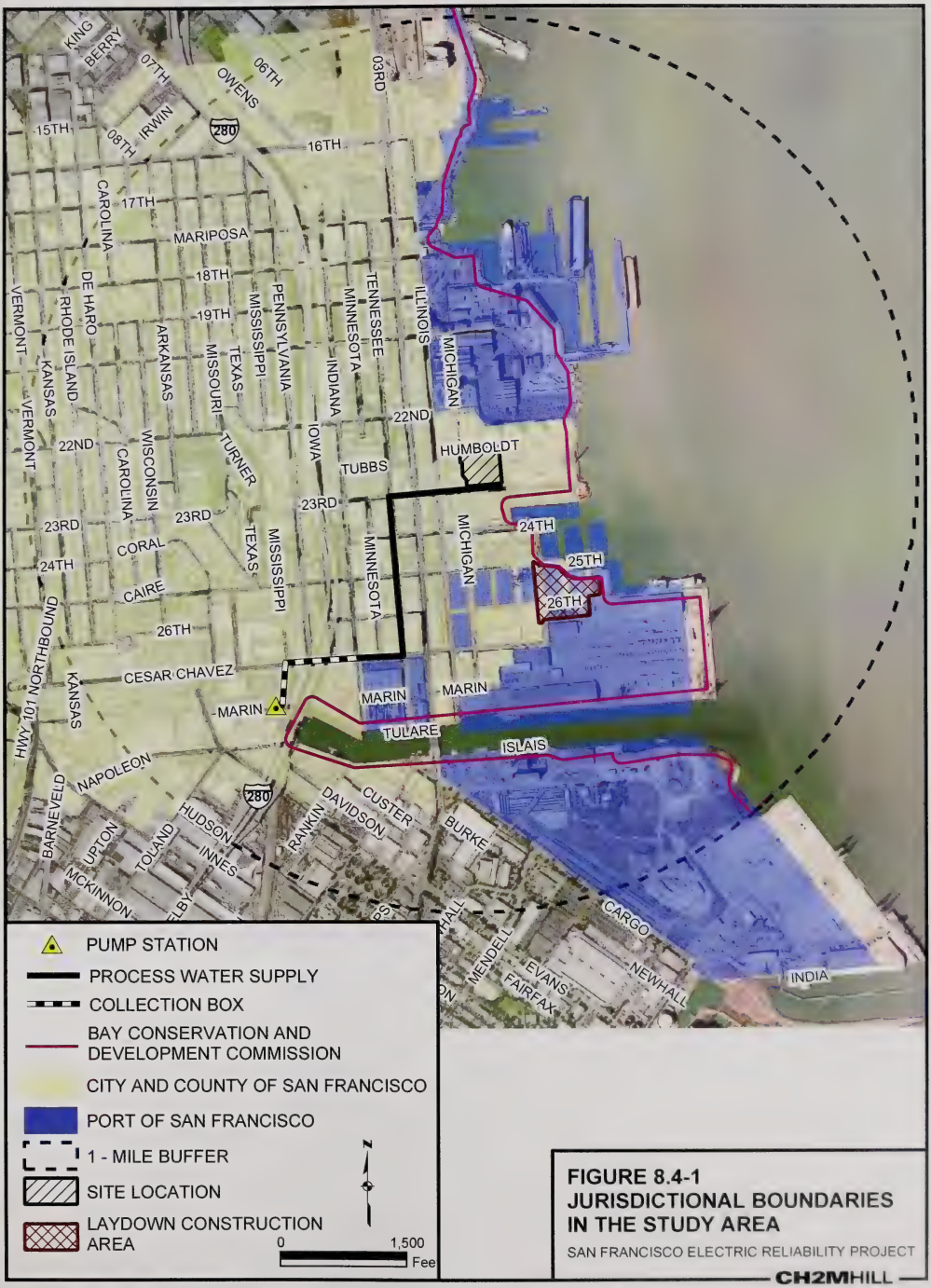
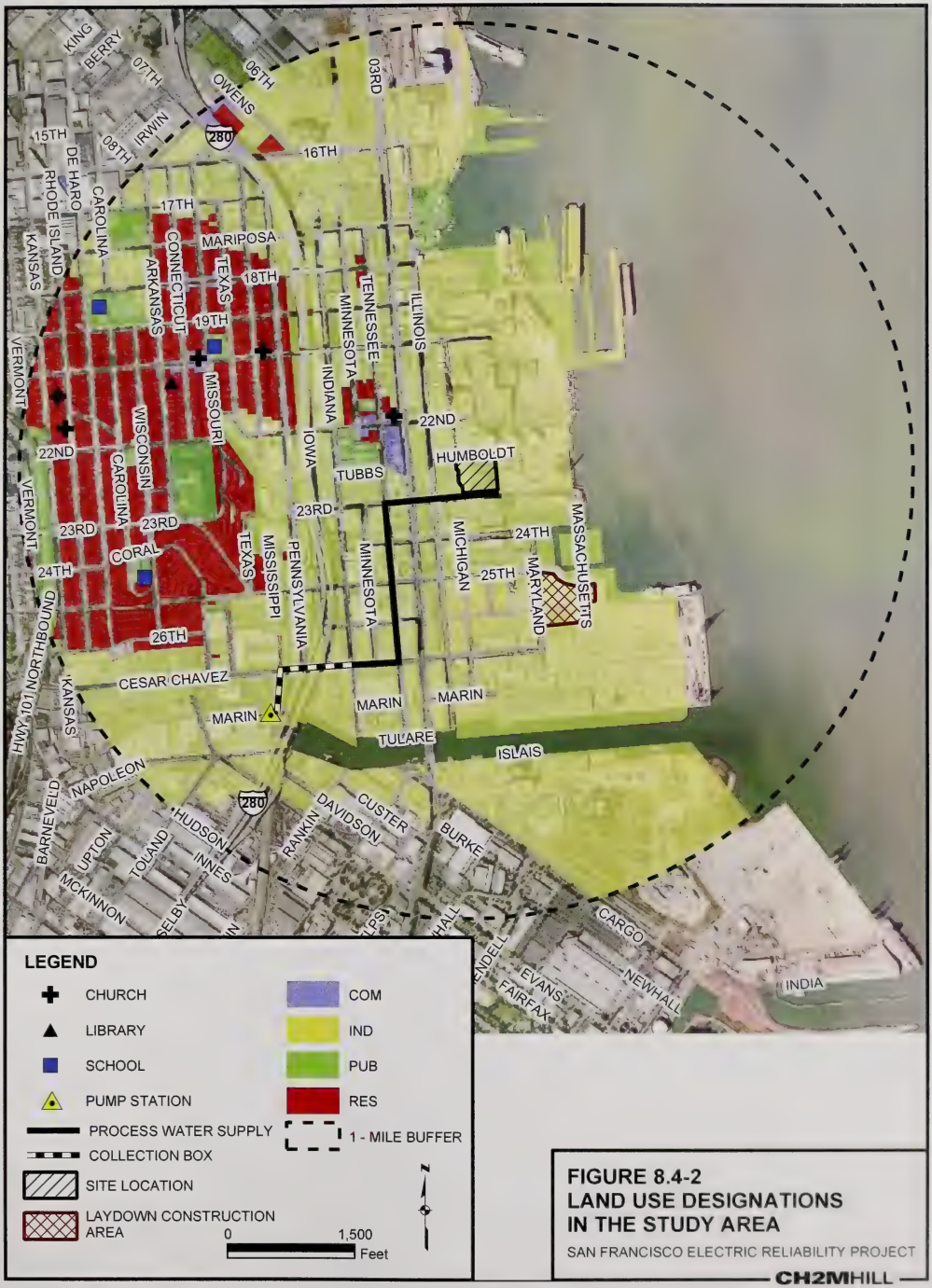


FIGURE 8.4-1
JURISDICTIONAL BOUNDARIES IN THE STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL



LEGEND

- CHURCH
- LIBRARY
- SCHOOL
- PUMP STATION
- PROCESS WATER SUPPLY
- COLLECTION BOX
- SITE LOCATION
- LAYDOWN CONSTRUCTION AREA
- COM
- IND
- PUB
- RES
- 1 - MILE BUFFER

0 1,500 Feet

FIGURE 8.4-2
LAND USE DESIGNATIONS IN THE STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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FIGURE 8.4-3
ZONING DESIGNATIONS IN THE STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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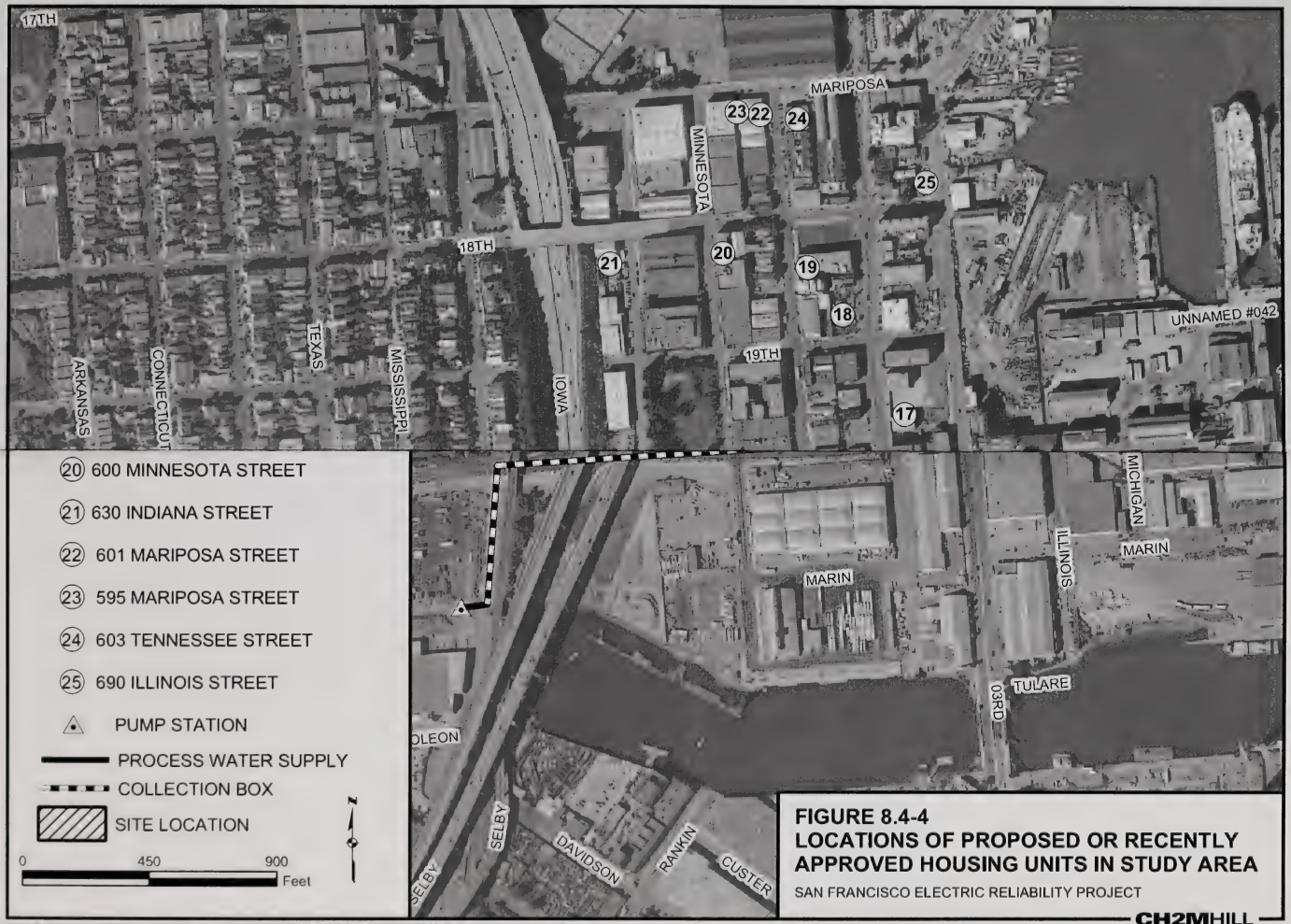


FIGURE 8.4-4
LOCATIONS OF PROPOSED OR RECENTLY APPROVED HOUSING UNITS IN STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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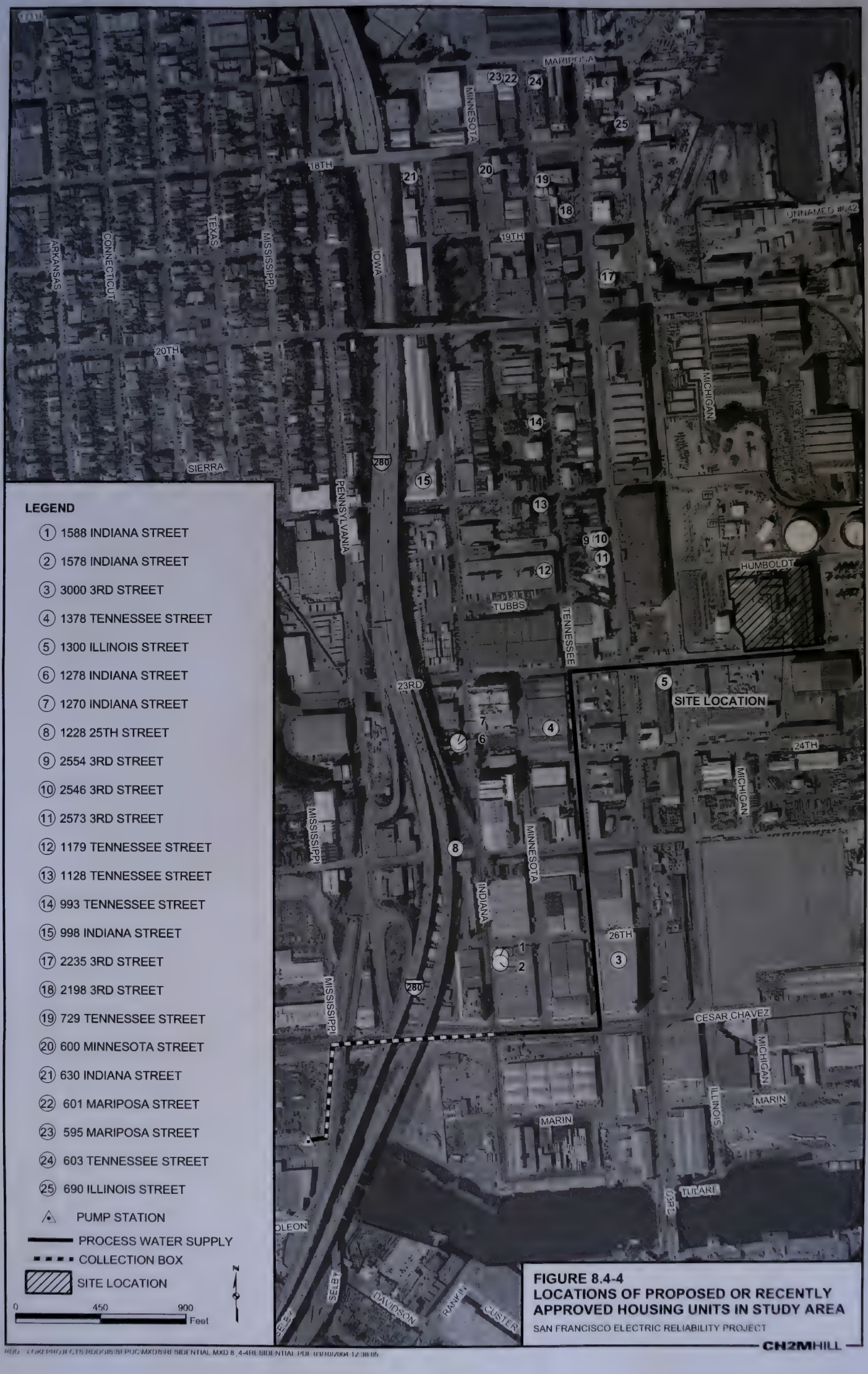


FIGURE 8.4-4
LOCATIONS OF PROPOSED OR RECENTLY APPROVED HOUSING UNITS IN STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SUBSECTION 8.5

Noise

8.5 Noise

8.5.1 Introduction

The project site is located in the City and County of San Francisco (CCSF). Generally, the design basis for noise control is the minimum, or most stringent, noise level required by any of the applicable laws, ordinances, regulations, or standards (LORS). Therefore, noise from this project is evaluated against San Francisco's General Plan and Noise Ordinance requirements.

Subsection 8.5.2 presents the fundamentals of acoustics while a description of the LORS is presented in Subsection 8.5.3. The affected environment is described in Subsection 8.5.4 and the environmental consequences (i.e., the potential project effects from both construction and operation) are analyzed in Subsection 8.5.5. Mitigation measures proposed to reduce potential impacts below the level of significance are presented in Subsection 8.5.6. The involved agencies and agency contacts are listed in Subsection 8.5.7. The permits and permitting schedule are discussed in Subsection 8.5.8. Subsection 8.5.9 provides the noise references.

This project site was previously evaluated for noise in the proceedings for the larger Potrero Power Plant Unit 7 (PPPU7) Project (00-AFC-4). This section refers to portions of the PPPU7 AFC filings (Dames & Moore, 2000) and the CEC's FSA (CEC, 2002) for that project.

8.5.2 Fundamentals of Acoustics

Acoustics is the study of sound, and noise is defined as unwanted sound. Airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave. Acoustical terms used in this subsection are summarized in Table 8.5-1.

TABLE 8.5-1
Definitions of Acoustical Terms

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise or sound at a given location. The ambient level is typically defined by the L_{eq} level.
Background Noise Level	The underlying ever-present lower level noise that remains in the absence of intrusive or intermittent sounds. Distant sources, such as traffic, typically makeup the background. The background level is generally defined by the L_{90} percentile noise level.
Intrusive	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, tonal content, the prevailing ambient noise level as well as the sensitivity of the receiver. The intrusive level is generally defined by the L_{10} percentile noise level.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

TABLE 8.5-1
Definitions of Acoustical Terms

Term	Definition
A-Weighted Sound Level (dBA)	The sound level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level, on an equal energy basis, during the measurement period.
Percentile Noise Level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (e.g., L_{90})
Day-Night Noise Level (L_{dn} or DNL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels from 10:00 p.m. to 7:00 a.m.

The most common metric is the overall A-weighted sound level measurement that has been adopted by regulatory bodies worldwide. The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound, thus achieving very good correlation in terms of how to evaluate acceptable and unacceptable sound levels.

A-weighted sound levels are typically measured or presented as equivalent sound pressure level (L_{eq}), which is defined as the average noise level, on an equal energy basis for a stated period of time, and is commonly used to measure steady state sound or noise that is usually dominant. Statistical methods are used to capture the dynamics of a changing acoustical environment. Statistical measurements are typically denoted by L_{xx}, where xx represents the percentile of time the sound level is exceeded. The L_{90} is a measurement that represents the noise level that is exceeded during 90 percent of the measurement period. Similarly, the L_{10} represents the noise level exceeded for 10 percent of the measurement period.

Another metric used in determining the impact of environmental noise is the differences in response that people have to daytime and nighttime noise levels. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes more noticeable. Furthermore, most people sleep at night and are sensitive to intrusive noises. To account for human sensitivity to nighttime noise levels, the Day-Night Sound Level (L_{dn} or DNL) was developed. L_{dn} is a noise index that accounts for the greater annoyance of noise during the nighttime hours.

L_{dn} values are calculated by averaging hourly L_{eq} sound levels for a 24-hour period, and apply a weighting factor to nighttime L_{eq} values. The weighting factor, which reflects the increased sensitivity to noise during nighttime hours, is added to each hourly L_{eq} sound level before the 24-hour L_{dn} is calculated. For the purposes of assessing noise, the 24-hour day is divided into two time periods, with the following weightings:

- Daytime: 7 a.m. to 10 p.m. (15 hours) Weighting factor of 0 dB
- Nighttime: 10 p.m. to 7 a.m. (9 hours) Weighting factor of 10 dB

The two time periods are then averaged to compute the overall L_{dn} value. For a continuous noise source, the L_{dn} value is easily computed by adding 6.4 dB to the overall 24-hour noise level (L_{eq}). For example, if the expected continuous noise level from the power plant was 60.0 dBA, the resulting L_{dn} from the plant would be 66.4 dBA.

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction
- Interference with activities such as speech, sleep, learning
- Physiological effects such as startling and hearing loss

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants typically experience noise effects in the last category. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard is primarily due to the wide variation in individual thresholds of annoyance and habituation to noise. Thus, an important way of determining a person's subjective reaction to a new noise is by comparing it to the existing or "ambient" environment to which that person has adapted. In general, the more the level or the tonal (frequency) variations of a noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

Table 8.5-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

TABLE 8.5-2
Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
Shotgun (at shooter's ear)	140	Carrier flight deck	Painfully loud
Civil defense siren (100 ft)	130		
Jet takeoff (200 ft)	120		Threshold of pain
Loud rock music	110	Rock music concert	
Pile driver (50 ft)	100		Very loud
Ambulance siren (100 ft)	90	Boiler room	
Pneumatic drill (50 ft)	80	Noisy restaurant	
Busy traffic; hair dryer	70		Moderately loud
Normal conversation (5 ft)	60	Data processing center	
Light traffic (100 ft); rainfall	50	Private business office	
Bird calls (distant)	40	Average living room library	Quiet
Soft whisper (5 ft); rustling leaves	30	Quiet bedroom	
	20	Recording studio	
Normal breathing	10		Threshold of hearing

Source: Beranek, 1998.

8.5.3 Laws, Ordinances, Regulations, and Standards

The following are the LORS that apply to noise generated by the project. They are summarized in Table 8.5-3 below.

TABLE 8.5-3
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
Federal Offsite:		
USEPA	Guidelines for state and local governments.	Subsection 8.5.3.1.1.
Federal Onsite:		
OSHA	Exposure of workers over 8-hour shift limited to 90 dBA.	Subsections 8.5.3.1.2, 8.5.5.2.1 and 8.5.5.3.1. Also see Subsection 8.7, Worker Safety
State Onsite:		
Cal/OSHA 8 CCR Article 105 Sections 095 et seq.	Exposure of workers over 8-hour shift limited to 90 dBA.	Subsections 8.5.3.2.1, 8.5.5.2.1 and 8.5.5.3.1. Also see Subsection 8.7, Worker Safety
State Offsite:		
Calif. Vehicle Code Sections 23130 and 23130.5	Regulates vehicle noise limits on California highways.	Delivery trucks and other vehicles will meet Code requirements.
Local		
California Government Code Section 65302	Requires local government to prepare plans that contain noise provisions.	City and County of San Francisco, Subsection 8.5.3.3.
San Francisco - Police Code Article 29, Sections 2901.11, 2909, 2915	Establishes a 75 dBA standard for industrial districts (M-2). Refer to Table 8.5-4 for detailed noise limits by zoning district. Provides a basis for public complaints if noises exceed the ambient by more than 5 dBA.	Subsections 8.5.3.3 and 8.5.5.3.4.
San Francisco - General Plan	The General Plan only addresses transportation-related noise.	Not Applicable

8.5.3.1 Federal

8.5.3.1.1 USEPA. Guidelines are available from the USEPA (1974) to assist state and local government entities in development of state and local LORS for noise. Because there are local LORS that apply to this project, these guidelines are not applicable.

8.5.3.1.2 OSHA. Onsite noise levels are regulated, in a sense, through the Occupational Safety and Health Act of 1970 (OSHA). The noise exposure level of workers is regulated at 90 dBA, over an 8-hour work shift to protect hearing (29 Code of Federal Regulations [CFR] 1910.95). Onsite noise levels will generally be in the 70- to 85-dBA range. Areas above 85 dBA will be posted as high noise level areas and hearing protection will be required. The power plant

will implement a hearing conservation program for applicable employees and maintain exposure levels below 90 dBA.

8.5.3.2 State of California

8.5.3.2.1 Cal-OSHA. The California Department of Industrial Relations, Division of Occupational Safety and Health enforces California Occupational Safety and Health Administration (Cal-OSHA) regulations, which are the same as the federal OSHA regulations described previously. The regulations are contained in Title 8 of the California Code of Regulations (CCR), General Industrial Safety Orders, Article 105, Control of Noise Exposure, Sections 5095, et seq.

8.5.3.2.2 California Vehicle Code. Noise limits for highway vehicles are regulated under the California Vehicle Code, Sections 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and the County Sheriff's Office.

8.5.3.3 Local

The California State Planning Law (California Government Code Section 65302) requires that all cities, counties, and entities (such as multi-city port authorities) prepare and adopt a General Plan to guide community change. The City General Plan contains noise provisions for transportation-related sources. The City Police Code, Article 29, contains provisions for stationary sources and establishes a 75 dBA standard for industrial districts (M-2). Table 8.5-4 identifies noise limits by zoning district. In addition, Article 29 provides a basis for public complaints of noises exceeding the ambient by more than 5 dBA.

TABLE 8.5-4
San Francisco Noise Level Limits by Zoning District

Zoning District	Time Period	Sound Level (dBA)
R-1-D, R-1, R-2 – Residential one and two houses	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	50 55
R-3, R-3.5, R-4, R-5, R-3-C, R-3.5-C, R-4-C, R-5-C – Residential multiple households and commercial/residential	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	55 60
C-1, C-2, C-3-O, C-3-R Commercial and Commercial/residential	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	60 70
M-1 – Light Industrial	Anytime	70
M-2 – Heavy Industrial	Anytime	75

Source: Potrero Unit 7 AFC, Table 8.5-8.

8.5.4 Affected Environment

The proposed San Francisco Electric Reliability Project (SFERP) site is a 4.5-acre parcel near Potrero Point in the Potrero District of San Francisco. The project site (Figure 8.5-1) is located along the eastern side of the San Francisco Peninsula, near the San Francisco Bay and north

of Warm Water Cove. Existing uses on, and adjacent to, the site include power plant generation facilities, oil storage, and an electrical substation.

A residential neighborhood exists along Tennessee Street, north of Tubbs Street. These are the closest residences to the project site, and are approximately 600 feet from the site. (They are located in a non-residentially zoned area.) Although they are the closest to the project they are screened from plant noise by a multi-story building located on Third Street between 22nd and 23rd streets. Noise from the existing power plant is not audible at any of these residences as a result of distance and the noise attenuating effects of the intervening industrial buildings (Dames & Moore, 2000). Other residences are located farther away in the Potrero Hill neighborhood west of Interstate 280 (CEC, 2002).

The closest residential receptor with a direct line-of-sight is on the southwest corner of the intersection of 23rd Street and Minnesota Street, about 1,200 feet from the proposed facility. This residential building was under construction when the PPPU7 AFC was filed and was the location of the 25-hour noise monitoring (ML1) conducted for PPPU7 (Dames & Moore, 2000).

Sources of environmental noise in the project area include the existing power plant and various transportation related sources.

8.5.4.1 Ambient Noise Survey

As part of the PPPU7 proceeding, measurements were collected on August 18 and 19, 1999 and on October 11 and 12, 1999 at four locations depicted in Figure 8.5-1. Since this monitoring was conducted, there have been no significant industrial changes in the area. Therefore, the data was considered representative for use in this application. Measurement results are summarized in Tables 8.5-5 through 8.5-7 (Dames & Moore, 2000).

TABLE 8.5-5
Short Term Sound Level Measurements
Sound levels measured on August 18 and 19, 1999.

Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
ML2: Approximately 100 Feet South of 23rd Street						
3:00 a.m. – 4:00 a.m.	61.7	62.3	61.5	58.7	54.5	71.9
2:00 p.m. – 3:00 p.m.	65.1	68.0	64.0	57.1	55.7	77.6
7:00 p.m. – 8:00 p.m.	64.5	66.9	63.0	57.2	52.6	74.4
ML3: Illinois Street Property Line at Substation						
4:00 a.m. – 5:00 a.m.	54.2	56.4	52.0	51.4	50.9	74.1
3:00 p.m. – 4:00 p.m.	61.8	64.2	59.9	58.7	57.4	73.4
8:00 p.m. – 9:00 p.m.	60.5	62.5	55.8	55.5	53.1	78.1
ML4: Approximately 50 Feet from the Intersection of 22nd and Missouri						
1:30 a.m. – 2:30 a.m.	49.8	52.5	48.9	45.4	43.2	60.8
1:00 p.m. – 2:00 p.m.	58.6	60.7	56.0	53.5	51.5	75.4
9:00 p.m. – 10:00 p.m.	50.6	52.0	49.4	46.6	42.9	69.9

Notes:
The temperature during the measurement periods ranged from approximately 55 degrees to 75 degrees.
The wind speed was less than 5 mph. The sky ranged from clear to overcast. There was no precipitation during the measurement periods. The humidity was not recorded.
All sound levels are expressed in dBA.
Source: Dames & Moore, 2002.

TABLE 8.5-6
25-Hour Sound Level Measurements
Offsite Measurement Location 1 (ML1) Sound levels measured on October 11 and 12, 1999, at ML1: approximately 50 feet from the intersection of 23rd Street and Minnesota Avenue.

Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}	Note
9:00 a.m. – 10:00 a.m.	68.6	71.9	63.5	58.9	55.4	90.7	1, 2, 3
10:00 a.m. – 11:00 a.m.	68.6	72.5	63.5	59.1	55.9	86.8	1, 2, 3
11:00 a.m. – 12:00 p.m.	68.0	71.6	63.5	57.1	46.1	90.3	1, 2, 3
12:00 p.m. – 1:00 p.m.	67.1	68.8	63.0	59.9	55.5	87.4	1, 2, 3
1:00 p.m. – 2:00 p.m.	66.2	68.9	62.0	57.2	46.9	84.9	1, 2, 3
2:00 p.m. – 3:00 p.m.	68.2	69.3	64.0	60.4	56.4	90.3	1, 2, 3
3:00 p.m. – 4:00 p.m.	66.1	68.7	62.4	60.1	55.4	83.2	1, 2, 3
4:00 p.m. – 5:00 p.m.	65.0	67.6	63.0	60.8	57.6	77.4	1, 2, 3
5:00 p.m. – 6:00 p.m.	65.6	68.1	62.4	60.0	56.8	83.5	1, 2, 3, 4
6:00 p.m. – 7:00 p.m.	66.2	67.8	61.5	59.3	56.2	87.8	1, 3
7:00 p.m. – 8:00 p.m.	63.8	66.3	60.0	56.4	52.6	83.0	1, 3
8:00 p.m. – 9:00 p.m.	60.9	61.8	56.6	54.3	49.7	83.0	1, 3
9:00 p.m. – 10:00 p.m.	61.7	63.5	57.9	53.8	51.5	83.0	1, 3
10:00 p.m. – 11:00 p.m.	59.2	60.1	54.6	51.6	49.5	79.1	1, 3
11:00 p.m. – 12:00 a.m.	57.3	57.3	52.6	49.9	47.8	80.5	1, 3
12:00 a.m. – 1:00 a.m.	56.3	58.0	52.0	49.5	48.5	72.3	1
1:00 a.m. – 2:00 a.m.	56.1	57.1	51.8	49.9	48.9	75.6	1
2:00 a.m. – 3:00 a.m.	55.9	57.2	51.5	49.8	48.9	78.9	1
3:00 a.m. – 4:00 a.m.	58.8	59.1	50.3	47.4	44.7	80.1	1
4:00 a.m. – 5:00 a.m.	60.0	62.6	54.0	50.3	46.7	78.8	1
5:00 a.m. – 6:00 a.m.	61.5	62.4	55.5	53.4	51.0	82.7	1
6:00 a.m. – 7:00 a.m.	65.8	69.1	59.9	55.9	52.5	84.7	1, 3
7:00 a.m. – 8:00 a.m.	68.3	70.5	61.6	57.6	54.7	89.2	1, 2, 3
8:00 a.m. – 9:00 a.m.	66.8	69.9	61.8	58.0	55.6	83.5	1, 2, 3
9:00 a.m. – 10:00 a.m.	65.3	68.1	61.3	57.1	54.6	80.7	1, 2, 3

Notes:
All sound levels are expressed in dBA.
The temperature during the measurement periods ranged from approximately 55 degrees to 75 degrees.
The wind speed was less than 5 mph. The sky ranged from clear to overcast. There was no precipitation during the measurement periods. The humidity was not recorded.
1. General vehicular traffic.
2. Construction activity (construction vehicles, power tools, banging and clanging of materials) at new live/work/loft.
3. Industrial activity at adjacent businesses.
4. Helicopter overflights.
Source: Dames & Moore, 2002.

TABLE 8.5-7
Short Term Sound Level Measurements
Sound levels measured on October 11 and 12, 1999.

Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
ML2: Approximately 100 Feet South of 23rd Street						
10:00 a.m. – 11:00 a.m.	63.5	64.4	58.5	55.6	52.6	79.7
7:00 p.m. – 8:00 p.m.	62.9	66.5	58.1	54.0	51.0	77.7
11:00 p.m. – 12:00 a.m.	60.2	64.0	55.5	52.9	49.9	79.9
ML4: Approximately 50 Feet from the Intersection of 22nd and Missouri						
11:15 a.m. – 12:15 p.m.	55.3	56.5	54.0	53.0	52.4	67.5
8:15 p.m. – 9:15 p.m.	52.1	55.9	51.5	48.8	46.9	65.8
10:00 p.m. – 11:00 p.m.	49.8	52.1	48.9	46.9	46.0	67.1

Notes:
All sound levels are expressed in dBA.
The temperature during the measurement periods ranged from approximately 55 degrees to 75 degrees.
The wind speed was less than 5 mph. The sky ranged from clear to overcast. There was no precipitation during the measurement periods. The humidity was not recorded.
ML2: Primary noise sources were vehicular traffic on nearby roads and industrial facilities. Noise from the Potrero Power Plant was audible during the measurement periods.
ML4: Primary noise sources were from vehicular traffic on Missouri Avenue and I-280. Noise from light industrial sources was periodically audible during the daytime. Noise from the Potrero Power Plant was not audible during the measurement periods.
Source: Dames & Moore, 2002.

Survey results show that the noise level of the most affected residential receptor (ML1) is primarily affected by vehicular traffic. The average noise levels over the 25-hour period were 65.9 dBA L_{eq}, 68.2 dBA L_{dn} and 55.9 dBA L_{90}. The average noise levels at the three short-term noise measurements sites were in the range of 60 to 65 dBA L_{eq} at ML2, 54 to 62 dBA L_{eq} at ML3, and 50 to 59 dBA L_{eq} at ML4. The existing power plant was noted to be 47 dBA and audible at ML2, which is located near the project boundary. (CEC, 2002).

8.5.5 Environmental Consequences

The proposed SFERP will produce noticeable noise but the noise levels will be in compliance with San Francisco's Noise Ordinance requirements for industrial properties. Noise will also be produced at the site during the construction phase of the project. Potential noise impacts from construction and operation activities are assessed in this subsection.

8.5.5.1 Significance Criteria

The City has established quantitative standards for determining appropriate noise levels for various zoning districts. These standards are summarized in Table 8.5-4. Noise impacts may be considered significant if project operational activities conflict with the Noise Level Limits by Zoning District summarized in Table 8.5-4.

In addition to the City criteria, the Energy Commission Staff concluded that a potential for a significance noise impact exists where the noise of the project exceeds the background noise by 5 dBA or more (CEC, 2002). It is important to note that the potential for an impact does not mean that there is an impact. Rather, it means that the project noise levels need further

evaluation. The Energy Commission staff concluded that construction noise is typically insignificant if: 1) the construction activity is temporary, 2) use of heavy equipment and noisy activities is limited to daytime hours and, 3) all feasible noise abatement measures are implemented for noise-producing equipment (CEC, 2002).

8.5.5.2 Construction Impacts

This subsection addresses the various components of construction noise and vibration.

8.5.5.2.1 Worker Exposure to Noise. Worker exposure levels during construction of the SFERP will vary depending on the phase of the project and the proximity of the workers to the noise-generating activities. Hearing protection will be available for workers and visitors to use as needed throughout the duration of the construction period. A Hearing Protection Plan, which complies with Cal-OSHA requirements, will be incorporated into the Health and Safety Plan.

8.5.5.2.2 Plant Construction Noise. Construction of the SFERP is expected to be typical of other power plants in terms of schedule, equipment used, and other types of activities. The noise level will vary during the construction period, depending upon the construction phase. Construction of power plants can generally be divided into five phases that use different types of construction equipment. The five phases are: 1) demolition, site preparation, and excavation; 2) concrete pouring; 3) steel erection; 4) mechanical; and 5) clean-up (Miller et al., 1978). In contrast to PPPU7, steam blows will not be required.

Both the USEPA Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment as well as from construction sites of power plants and other types of facilities (USEPA, 1971; Barnes et al., 1976). Since specific information on types, quantities, and operating schedules of construction equipment is not available at this point in project development, information from these documents for similarly sized industrial projects will be used. Use of this data, which is between 21 and 26 years old, is conservative since the evolution of construction equipment has been toward quieter designs to protect operators from exposure to high noise levels.

The loudest equipment types generally operating at a site during each phase of construction are presented in Table 8.5-8. The composite average or equivalent site noise level, representing noise from all equipment, is also presented in the table for each phase.

TABLE 8.5-8
Construction Equipment and Composite Site Noise Levels

Construction Phase	Loudest Construction Equipment	Equipment Noise Level (dBA) at 50 feet	Composite Site Noise Level (dBA) at 50 feet
Demolition, Site Clearing, and Excavation	Dump Truck	91	89
	Backhoe	85	
Concrete Pouring	Truck	91	78
	Concrete Mixer	85	
Steel Erection	Derrick Crane	88	87
	Jack Hammer	88	

TABLE 8.5-8
Construction Equipment and Composite Site Noise Levels

Construction Phase	Loudest Construction Equipment	Equipment Noise Level (dBA) at 50 feet	Composite Site Noise Level (dBA) at 50 feet
Mechanical	Derrick Crane	88	87
	Pneumatic Tools	86	
Cleanup	Rock Drill	98	89
	Truck	91	

Source: USEPA, 1971; Barnes et al., 1976.

Average or equivalent construction noise levels projected at various distances from the site are presented in Table 8.5-9. These results are conservative since the only attenuating mechanism considered was divergence of the sound waves in open air. Shielding effects of intervening structures are not included in the calculations. The construction noise may be audible at the nearest residences but is not anticipated to exceed current exposure levels and the noisiest construction activities will be confined to the daytime hours. Table 8.5-10 presents noise levels from common construction equipment at various distances.

TABLE 8.5-9
Average Construction Noise Levels at Various Distances

	Sound Pressure Level (dBA)		
Construction Phase	375 feet	1,500 feet	3,000 feet
Demolition, Site Clearing, and Excavation	71	59	53
Concrete Pouring	60	48	42
Steel Erection	69	57	51
Mechanical	69	57	51
Clean-Up	71	59	53

TABLE 8.5-10
Noise Levels from Common Construction Equipment at Various Distances

Construction Equipment	Typical Sound Pressure Level at 50 feet (dBA)	Typical Sound Pressure Level at 375 feet (dBA)	Typical Sound Pressure Level at 1,500 feet (dBA)
Pile Drivers (20,000-32,000 ft-lbs./blow)	104	86	74
Dozer (250-700 hp)	88	70	58
Front End Loader (6-15 cu. yds.)	88	70	58
Trucks (200-400 hp)	86	68	56
Grader (13 to 16 ft. blade)	85	67	55

TABLE 8.5-10
Noise Levels from Common Construction Equipment at Various Distances

Construction Equipment	Typical Sound Pressure Level at 50 feet (dBA)	Typical Sound Pressure Level at 375 feet (dBA)	Typical Sound Pressure Level at 1,500 feet (dBA)
Shovels (2-5 cu. yds.)	84	66	54
Portable Generators (50-200 kW)	84	66	54
Derrick Crane (11-20 tons)	83	65	53
Mobile Crane (11-20 tons)	83	65	53
Concrete Pumps (30-150 cu. yds.)	81	63	51
Tractor (3/4 to 2 cu. yds.)	80	62	50
Unquieted Paving Breaker	80	62	50
Quieted Paving Breaker	73	55	43

Noise generated during the testing and commissioning phase of the project is not expected to be substantially different from that produced during normal full-load operation. Starts and abrupt stops are more frequent during this period, but on the whole they are usually short-lived.

8.5.5.2.3 Construction Vibration. Construction vibrations can be divided into three classes, based on the wave form and its source:

Wave form: Impact	Example source: impact pile driver or blasting
Wave form: Steady state	Example source: vibratory pile driver
Wave form: Pseudo steady state	Example source: double acting pile hammer

Pile driving is not currently anticipated. If pile driving turns out to be required, mitigation measures (if needed) shall be developed in consultation with the CEC Compliance Project Manager.

8.5.5.3 Operational Impacts

This subsection describes the expected noise impacts from operation of the plant.

8.5.5.3.1 Worker Exposure to Operational Noise. Nearly all components will be specified not to exceed near-field maximum noise levels of 90 dBA at 3 feet (or 85 dBA at 3 feet where available as a vendor standard). Since there are no permanent or semi-permanent workstations located near any piece of noisy plant equipment, no worker's time-weighted average exposure to noise should approach the level allowable under OSHA guidelines. Nevertheless, signs requiring the use of hearing protection devices will be posted in all areas where noise levels commonly exceed 85 dBA, such as inside acoustical enclosures. Outdoor levels throughout the plant will typically range from 90 dBA near certain equipment to roughly 65 dBA in areas more distant from any major noise source.

8.5.5.3.2 Transmission Line and Switchyard Noise Levels. SFERP will link to the power grid through the PG&E Potrero Substation by two 3-phase aboveground transmission lines. The proposed 115-kV connection will cross over an existing PG&E service road between SFERP and the PG&E Substation to towers located within the Potrero switchyard. Corona is generally associated with transmission lines of 230 kV or greater. Consequently, no impact is expected from the operation of the electrical transmission lines.

8.5.5.3.3 Process Water Supply Pipeline and Water Pump Station Noise Levels. Operational noise from the buried process water supply pipeline is not anticipated to generate any audible noise. The water pump station will be designed to comply with the City's noise requirements and is not anticipated to increase offsite noise level by a measurable amount.

8.5.5.3.4 Plant Operation Noise Levels. A noise model of the proposed SFERP facility has been developed using source input levels derived from manufacturers' data and field surveys of similar equipment. The noise emissions from the plant have been calculated at the residential receptors of potential concern. The noise levels presented represent the anticipated steady-state level from the plant with essentially all equipment operating.

The model divides the proposed facility into a list of individual point and area noise sources representing each piece of equipment that produces a significant amount of noise. The sound power levels representing the standard performance of each of these components are assigned based either on field measurements of similar equipment made at other existing plants, data supplied by manufacturers, or information found in the technical literature. Using these standard power levels as a basis, the model calculates the sound pressure level that would occur at each receptor from each source after losses from distance, air absorption, blockages, etc. are considered. The sum of all these individual levels is the total plant level at the modeling point. The sound propagation factors used in the model have been adopted from ISO 9613-2 *Acoustics - Sound Attenuation During Propagation Outdoors.*

The sound power levels, by octave band, used in the model are summarized in Table 8.5-11.

TABLE 8.5-11
Octave Band Sound Power Levels Used to Model SFERP Operations, dB (Flat)

	Octave Band Center Frequency, Hz									
Plant Component	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
Stacks[a]	122	115	106	102	94	80	80	83	78	97.7
LM6000 Combustion Turbine Generators (CTG)	116	115.1	110.8	109.4	104.6	101.1	99.4	100.3	90.5	108.3
Cooling Tower	108	108	109	106	101	93	89	87	85	102.4
Chiller	96.2	85.7	91.5	82.6	90.6	89.2	70.1	59	41.4	91.6
Fuel Gas Compressors[b]	116.9	116.6	111.1	111.2	109.4	107.8	109.9	109.1	107.5	116
Gas Cooler[b]	106.8	111.3	107.4	97.7	98.7	93.4	99.4	102.8	101.0	107.3
Transformers	108	111	105	105	100	94	91	88	88	102
SCR Duct Walls	121.4	117	113	106.2	97.1	83.2	75.6	73	62	101.7

Notes:
[a] Includes stack silencers.
[b] A combination of noise barriers or enclosures will be constructed to reduce these levels by at least 13 dBA.

Noise from the project is predicted not to exceed 54 dBA at ML1 and ML4, the residential noise monitoring locations shown in Figure 8.5-1. This is consistent with the CEC's 5 dBA over background guideline and complies with LORS

8.5.5.3.5 Tonal Noise. As a general rule, LM 6000-based plants, even those without significant noise controls, do not produce discrete tones that are prominent or noticeable at typical receptor distances. At the monitoring locations modeled here, no significant tones are anticipated.

That is not to say that audible tones are impossible—certain sources within the plant such as the combustion turbine inlets, transformers, pump motors, cooling tower fan gearboxes, etc. have been known to sometimes produce significant tones. It is the Applicant's intention to anticipate the potential for audible tones in the design and specification of the plant's equipment and take necessary steps to prevent sources from emitting tones that might be disturbing at the nearest receptors.

8.5.5.3.6 Ground and Airborne Vibration. Similar LM6000-based facilities have not resulted in ground or airborne vibration impacts. The proposed project is primarily driven by gas turbines exhausting into a selective catalytic reduction (SCR) duct and a stack silencer. These very large ducts reduce low frequency noise, which is mainly the source of airborne induced vibration of structures.

The equipment that would be used in the proposed project is well balanced and is designed to produce very low vibration levels throughout the life of the project. An imbalance could contribute to ground vibration levels in the vicinity of the equipment. However, vibration-monitoring systems installed in the equipment are designed to ensure that the equipment remains balanced. Should an imbalance occur, the event would be detected and the equipment would automatically shut down.

8.5.6 Mitigation Measures

The following mitigation measures are anticipated to be included in the project.

8.5.6.1 Noise Mitigation Measure #1

The project owner shall establish a telephone number for use by the public to report any significant undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

8.5.6.2 Noise Mitigation Measure #2

Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all legitimate project related noise complaints.

The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form typically suggested by CEC or functionally equivalent procedure to document and respond to each noise complaint

- Attempt to contact the person(s) making the noise complaint within 24 hours
- Conduct an investigation to attempt to determine the source of noise related to the complaint
- If the noise complaint is legitimate, take all feasible measures to reduce the noise at its source

8.5.6.3 Noise Mitigation Measure #3

Noisy construction or demolition work (that which causes offsite annoyance as evidenced by the filing of a legitimate noise complaint) shall be restricted to the times of day delineated below:

- 7 a.m. to 8 p.m. unless otherwise permitted in accordance with the San Francisco Municipal Code Section 2908

Construction equipment shall comply with the noise level limits of the San Francisco Municipal Code, Section 2907. Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

8.5.6.4 Noise Mitigation Measure #4

The project design and implementation shall include noise mitigation measures adequate to ensure that operation of the project will not exceed the noise standards of the City Municipal Code. Specifically, noise due to operation of the project shall not exceed the existing background noise level (49 dBA – calculated by averaging the four quietest continuous hours recorded at ML1) by more than 5 dBA. The resulting noise levels will, therefore, not exceed 54 dBA at ML1.

Furthermore, the project will not result in noise impacts at residentially or commercially zoned areas in excess of the City's noise zoning criteria. Live/work units located in areas zoned light or heavy industrial (M1 or M2) are considered by the City as industrial uses.

8.5.7 Involved Agencies and Agency Contacts

Agency contacts relative to noise issues are presented in Table 8.5-12.

TABLE 8.5-12
Agency Contacts

Agency	Contact	Issue	Telephone
San Francisco Police Department	Officer Qwan 201 Williams Street San Francisco, CA	Article 29 of Police Code	(415) 671-2300
San Francisco Department of Public Health	Sue Cone, Program Manager	Noise Standards	(415) 252-3991
San Francisco Planning Department	Jasper Rubin, Planner/Geographer 1600 Mission Street San Francisco, CA 94103-2414	Noise Standards	415-558-6310

8.5.8 Permits Required and Permit Schedule

No permits are required; therefore, there is no permit schedule.

8.5.9 References

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U.S. Environmental Protection Agency (USEPA). 1971. Noise from Construction Equipment and Operations, US Building Equipment, and Home Appliances. Prepared by Bolt Beranek and Newman for USEPA Office of Noise Abatement and Control, Washington, DC.



FIGURE 8.5-1
NOISE MONITORING LOCATIONS AND EXISTING RESIDENCES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

SUBSECTION 8.6

Public Health

8.6 Public Health

8.6.1 Introduction

The City of San Francisco intends the San Francisco Electric Reliability Project (SFERP) to improve public health in the Southeast San Francisco community. The SFPUC is pursuing the SFERP to support closure of old dirtier existing generation in the City both immediately and over the longer term and hence improve air quality. Nonetheless, the SFPUC recognizes that the SFERP will have impacts on the Southeast San Francisco community and is committed to developing a PM_{10} mitigation/community benefits package to ensure that the SFERP results in net public health benefits to the community. Section 4, Environmental Justice, describes these efforts in greater detail.

This subsection presents an assessment of risks to human health potentially associated with operation of the proposed SFERP in accordance with the requirements of the CEC. The conclusions from this analysis do not detract from the City's commitment to implement an acceptable PM_{10} mitigation/community benefits package. The subsection focuses on chemical pollutants that could be emitted or released. Air pollutants for which California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS) have been established are also addressed in Subsection 8.1.

The principal concerns for public health are associated with emissions of chemical substances to the air during routine operation of the proposed facility. Chemical substances in air that potentially pose risks to human health include byproducts from the combustion of natural gas.

Combustion byproducts with established CAAQS or NAAQS, including oxides of nitrogen (NO_x), carbon monoxide, sulfur dioxide, and fine particulate matter are addressed in the Ambient Air Quality subsection (see Subsection 8.1.3). However, some discussion of the potential health risks associated with these substances is presented in this subsection. Human health risks potentially associated with accidental releases of stored acutely hazardous materials at the proposed facility (aqueous ammonia) are also discussed in this subsection.

8.6.2 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this subsection. The relevant laws, ordinances, regulations, and standards (LORS) that affect public health and are applicable to this project are identified in Table 8.6-1. Table 8.6-1 also summarizes the primary agencies responsible for public health, as well as the general category of public health concerns regulated by each of these agencies. The conformity of the project to each of the LORS applicable to public health is also presented in this table, as well as references to the locations where each of these issues is addressed. Points of contact with the primary agencies responsible for public health are identified in Table 8.6-2.

8.6.3 Affected Environment

The SFERP will be a nominal 145-megawatt (MW) simple-cycle generating facility configured using three natural-gas-fired LM 6000 gas turbines and associated infrastructure. The project will include the construction of a new air-insulated 115-kV switchyard on the

west side of the site. Natural gas for the project will be delivered to the site via a pipeline tie-in made to an existing PG&E natural gas load center located adjacent to the site. Water for the project would be delivered via a City process water pump station located on Marin Street near Cesar Chavez to a new water treatment plant located on the southern portion of the project site, adjacent to 23rd Street.

TABLE 8.6-1
Summary of Primary Regulatory Jurisdiction for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Clean Air Act	Public exposure to air pollutants	U.S. Environmental Protection Agency (USEPA) Region IX California Air Resources Board (CARB) Bay Area Air Quality Management District (BAAQMD)	Based on results of risk assessment as per California Air Pollution Control Officers Association (CAPCOA) guidelines, toxic contaminants do not exceed typically used thresholds (see Subsection 8.6.3.2). Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the facility. The impact from increases in emissions of criteria pollutants will be offset (see Subsection 8.6.5.1).
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	Office of Environmental Health and Hazard Assessment (OEHHA)	Based on results of a risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings (see Subsection 8.6.4.2).
40 CFR Part 68 (Risk Management Plan)	Public exposure to acutely hazardous materials	USEPA Region IX San Francisco Department of Public Health	An offsite consequent analysis was performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank (see Subsection 8.6.4.3 and Appendix 8.12A). A risk management plan (RMP) will be prepared prior to commencement of facility operations (see Subsection 8.6.5.3).
Health and Safety Code Sections 25531 to 25541	Public exposure to Regulated Substances	San Francisco Department of Public Health CARB BAAQMD	An offsite consequent analysis was performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank (see Subsection 8.6.4.3 and Appendix 8.12A).
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB BAAQMD	Based on results of a risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed typically-used thresholds (see Subsection 8.6.4.2).
Environmental Code Chapter 10, Department of Public Works, Order No. 171,378	Particulate matter and other air borne materials have been shown to have an adverse impact on public health	City Agencies awarding contracts and the San Francisco Department of Public Works	The SFPUC will implement dust reduction measures set forth in the Environmental Code and Order 171,378 during construction of the project.

TABLE 8.6-2
Summary of Agency Contacts for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Clean Air Act	Public exposure to air pollutants	USEPA Region IX	Gerardo Rios, 916-744-1259
		CARB	Mike Tollstrup, 916-322-6026
		BAAQMD	Brian Bateman, 415-749-4653
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	Office of Environmental Health and Hazard Assessment (OEHHA)	Cynthia Oshita or Susan Long 916-445-6900
40 CFR Part 68 (Risk Management Plan)	Public exposure to acutely hazardous materials	USEPA Region IX	Gerardo Rios, 916-744-1259
		San Francisco Department of Public Health	Sue Cone, 415-252-3991
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	San Francisco Department of Public Health	Sue Cone, 415-252-3991
		BAAQMD	Brian Bateman, 415-749-4653
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB	Mike Tollstrup, 916-322-6026
		BAAQMD	Brian Bateman, 415-749-4653
Department of Public Works, Order No. 171,378	Exposure by the public in general and school children in particular to dust from excavations	San Francisco Department of Public Works	Stanley DeSouza, 415-554-8369

The site (see Figure 2-1) is located on a 4.5-acre parcel located on a portion of the previously proposed Potrero Power Plant (Potrero PP) Unit 7 site. There are several sensitive receptor facilities (such as schools, day care facilities, convalescent centers, or hospitals) in the vicinity of the project site. The closest of these receptors is the Warm Water Cove Public Access area, a park located approximately 300 feet south of the project site. Sensitive receptors within a 3-mile radius of the project site are shown on Figure 8.6-1 and descriptions of the receptors are presented in Table 8.12-2. Further description of sensitive receptors within a 3-mile radius of the project site is presented in Subsection 8.12, Hazardous Materials.

The terrain within a 10-mile radius of the project is provided under separate cover on 7.5-minute U.S. Geological Survey (USGS) Quad maps, five sets of which have been

submitted to the California Energy Commission (CEC). Figure 8.6-2 provides an index of the 7.5-minute Quad maps within the project vicinity.

8.6.4 Environmental Consequences

Environmental consequences potentially associated with the project are human exposure to chemical substances emitted into the air. The human health risks potentially associated with these chemical substances were evaluated in a health risk assessment. The chemical substances potentially emitted to the air from the proposed facility include ammonia, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) from the combustion turbines, and ammonia and trace metals from the cooling tower. These chemical substances are listed in Table 8.6-3.

TABLE 8.6-3
Chemical Substances Potentially Emitted to the Air

Criteria Pollutants	Noncriteria Pollutants (Toxic Pollutants)	
Carbon monoxide	Ammonia	Xylene
Ozone	Acetaldehyde	Chromium
Sulfur dioxide	Acrolein	Polycyclic aromatic hydrocarbons (PAHs)
Oxides of nitrogen	1,3-Butadiene	Benzo(a)anthracene
Particulate matter	Benzene	Benzo(a)pyrene
	Ethylbenzene	Benzo(b)fluoranthene
	Formaldehyde	Benzo(k)fluoranthene
	Hexane	Chrysene
	Propylene	Dibenz(a,h)anthracene
	Propylene oxide	Indeno(1,2,3-cd)pyrene
	Toluene	Naphthalene
		Arsenic

8.6.4.1 Criteria Pollutants

Emissions of criteria pollutants will adhere to NAAQS or CAAQS as discussed in the Ambient Air Quality subsection (see Subsection 8.1.4). The proposed facility will also include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under Bay Area Air Quality Management District (BAAQMD) rules. Offsets will be provided for emissions of criteria pollutants that exceed specified thresholds to assure that the project will not result in an increase in total emissions in the vicinity. Finally, air dispersion modeling results (presented in the Ambient Air Quality, Subsection 8.1.5.1.2) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS), with the exception of the state PM_{10} and the state and federal $PM_{2.5}$ standards. The City intends to develop a PM_{10} mitigation package.

Potentially-sensitive individuals may become exposed to emissions of criteria pollutants from the project. Most of the criteria pollutants are associated with adverse effects to the respiratory system. Therefore, sensitive individuals would consist of individuals with pre-existing respiratory diseases such as asthma, bronchitis or chronic obstructive pulmonary disease.

Epidemiological studies have indicated that exposures to elevated levels of criteria pollutants, especially particulate matter and ozone, are associated with a variety of respiratory and cardiovascular effects. These effects may include aggravation of existing respiratory conditions, such as asthma. Because of concerns for potentially sensitive individuals, the SFPUC will make best efforts to obtain offsets locally to ensure that impacts on the local community from the SFERP are not offset against benefits to remote communities.

8.6.4.2 Toxic Pollutants

Potential impacts associated with emissions of toxic pollutants to the air from the proposed facility were addressed in a health risk assessment, presented in Appendix 8.1D. The risk assessment was prepared using guidelines developed under the AB 2588 Air Toxics "Hot Spots" Information and Assessment Act (California Air Pollution Control Officers Association [CAPCOA] 1993).

Emissions of toxic pollutants potentially associated with the facility were estimated using emission factors approved by the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (USEPA). The impact of the SFERP emissions on the concentrations of these pollutants in the air were estimated using dispersion modeling. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in a risk assessment, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for noncancer health effects (for noncarcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI). The hypothetical MEI is an individual assumed to be located at the point where the highest concentrations of air pollutants associated with facility emissions are predicted to occur, based on air dispersion modeling. Human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MEI. If there is no significant impact associated with concentrations in air at the MEI location, it is unlikely that there would be significant impacts in any location in the vicinity of the facility.

Health risks potentially associated with concentrations of carcinogenic pollutants in air were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ (microgram per cubic meter) over a 70-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in air over a 70-year lifetime. Evaluation of potential noncancer health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations in air with reference exposure levels (RELs). A REL is a concentration in air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential noncancer effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is the hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in air were obtained from the *Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines* (CAPCOA, 1993), and are presented in Table 8.6-4.

TABLE 8.6-4
Toxicity Values Used to Characterize Health Risks

Compound	Unit Risk Factor $(\mu g/m^3)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)
Acetaldehyde	2.7E-06	9.00E+00	—
Acrolein	—	0.06	1.9E-01
Ammonia	—	200	3.2E+03
Arsenic	3.3E-03	5.10E-01	—
Benzene	2.9E-05	60	1.3E+03
1,3-Butadiene	1.7E-04	20	—
Cadmium	4.2E-03	0.02	—
Chromium VI	1.4E-01	2.00E-03	—
Copper	—		1.00E+02
Ethylbenzene	—	2000	—
Formaldehyde	6.0E-06	3.0E+00	9.4E+01
Hexane	—	7000	—
Lead	1.20E-05		—
Mercury	—	0.09	1.80E+00
Naphthalene	—	9	—
Nickel	2.60E-04	0.05	6.00E+00
Polycyclic aromatic hydrocarbons	1.1E-03 to 1.1E-05*	—	—
Propylene	—	3000	—
Propylene oxide	3.7E-06	3.00E+01	3.10E+03
Silver	—	—	—
Toluene	—	3.00E+02	3.7E+04
Xylene	—	7.00E+02	2.20E+03
Zinc	—	3.50E+01	—

Source: CAPCOA, 1993
* URF varies by compound. Individual compounds and URFs are listed in Appendix 8.1C, Table 8.1C-1.

8.6.4.2.1 Toxic Air Pollutant Risks. A risk of 10 in one million is used by the Commission as a threshold for evaluating cancer risks associated with facility emissions. Excess lifetime cancer risks less than 1 in one million (1×10^{-6}) are not typically considered to represent significant public health impacts that require additional controls of facility emissions. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 8.1D.

The excess lifetime cancer risk associated with concentrations in air for the MEI location is estimated to be 0.02×10^{-6}, based on emissions from operation of the SFERP facility. The excess lifetime cancer risk is also presented graphically in Figure 8.6-3a. Note that there is no human habitation at the MEI location. As shown in Figure 8.1C-1, the MEI from SFERP is located in San Francisco Bay. The closest sensitive receptor is 0.5 mile from the facility site. The excess lifetime cancer risk at the closest inhabited location (a workplace) is 0.003 in one million.

The excess lifetime cancer risk at the closest residence is 0.01 in one million. The excess lifetime cancer risk associated with concentrations in air estimated for the MEI location based on diesel emissions during construction is 1.1 in one million. The MEI location for construction emissions is located very close to the project site, approximately 100 meters from the fenceline. The excess lifetime cancer risk from diesel emissions during construction at the nearest residence is 0.06 per million.

A hazard quotient of one as a threshold for noncancer effects is consistent with the guidelines presented in the *Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines* (CAPCOA, 1993). The chronic noncancer hazard indices associated with concentrations in air estimated for the MEI location are 0.002, combined across all target organs. The chronic noncancer risk associated with the project is presented in Figure 8.6-3b. The acute noncancer hazard indices summed across all target organs was 0.03, and also fell below one for all target organs. The acute noncancer risk associated with the project is presented in Figure 8.6-3c.

The detailed methodology for the risk assessment is presented in CAPCOA, 1993, and the calculations used to estimate health risks associated with emissions to the air is presented in Appendix 8.1C.

8.6.4.2.2 Characterization of Risks from Toxic Air Pollutants. The estimates of excess lifetime cancer and noncancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have been used to extrapolate from high to low doses. This modeling procedure is designed to provide a conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that man is as sensitive as the most sensitive animal species). (USEPA, 1986; USEPA, 1996).

An excess lifetime cancer risk of 1×10^{-6} is typically used as a threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, originates from efforts by the Food and Drug Administration (FDA) to use quantitative risk assessment for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt, 1985). The associated dose, known as a "virtually safe dose" (VSD), has become a standard used by many policy makers and the lay public for evaluating cancer risks.

Health risk assessments for toxic air pollutants are prepared conservatively, to assure protection of public health. Some of the key assumptions used to assure that risks are estimated in a protective manner include:

- Estimating maximum "worst-case" emissions from the facility. The maximum "worst-case" emission scenario does not have to be feasible from an operational or economic perspective.
- Estimating the levels (or concentrations) of chemicals in air based on worst-case meteorological conditions, including the wind speeds and direction that would result in the highest concentrations in air from facility emissions.

- Estimating potential human exposure to a hypothetical maximum exposed individual who is assumed to be located at the point where the highest pollutant concentrations will be found. The maximum exposed individual is assumed to be located at that point continuously (24 hours/day, 365 days/year) for a 70-year lifetime.
- The maximum exposed individual is assumed to be exposed through multiple exposure pathways: inhalation, soil ingestion, ingestion of breast milk as an infant and skin contact with soil.

The estimated lifetime cancer risks to the maximally exposed individual are less than 1×10^{-6} for air emissions from the SFERP facility, and the aggregated cancer burden associated with this risk level is less than one excess cancer case. The estimated lifetime cancer risks to the maximally exposed individual from diesel emissions during construction is slightly higher than 1×10^{-6} at the MEI location; however, the risks at locations with human habitations fall below 1×10^{-6}.

8.6.4.3 Hazardous Materials

There is the potential for disturbance of hazardous materials during the construction of the SFERP. Also, hazardous materials will be used and stored at the facility. The hazardous materials stored in significant quantities onsite and descriptions of their uses are presented in Subsection 8.12. As described in Subsection 8.13 on Waste Management, construction will be required to comply with the requirements of Article 22A of the San Francisco Health Code. In addition, the City will comply with the requirements of the City Environmental Code, Chapter 10 and Order No. 171,378 of the Department of Public Works.

Use of chemicals at the proposed facility will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant impacts to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate offsite could result in potential impacts to the public.

The California Health and Safety Code Sections 25531 to 25541 and Title 40 Code of Federal Regulations (CFR) Part 68 under the Clean Air Act establish emergency response planning requirements for Regulated Substances. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a Regulated Substance. The only regulated substance to be used at the facility is aqueous ammonia as discussed in Subsection 8.12. Aqueous ammonia may generate hazardous gases that could migrate offsite when released.

An offsite consequence analysis (OCA) was performed and is included in Appendix 8.12A. The OCA assesses the potential risks to humans at various distances from the site if a spill or rupture of the aqueous ammonia storage tank were to occur. Based on the results of this analysis, a catastrophic release of ammonia from the complete failure of the storage tank would result in ammonia concentrations 75 parts per million (ppm) extending offsite approximately 7 feet and 25 part per million ammonia concentrations extending 17 feet off the project site. In fact, releases to the north, south, and western boundaries of the SFERP, the boundaries accessible to the public, will not exceed a concentration of 5 ppm. At these concentrations, no public health impacts would be expected.

8.6.4.4 Operation Odors

Small amounts of ammonia used to control oxides of nitrogen (NO_x) emissions may escape up the exhaust stack but would not produce operational odors. The expected exhaust gas ammonia concentration, known as ammonia "slip," will be 10 ppm or lower. After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppm that the Compressed Gas Association has determined to be acceptable. Therefore, potential ammonia emissions are not expected to create objectionable odors. Other combustion contaminants are not present at concentrations that could produce objectionable odors. Operation odor from the water treatment facility will be controlled by enclosing the entire facility in a building and treating all exhaust air with an activated charcoal air filtration system.

8.6.5 Mitigation Measures

As stated earlier, in addition to purchasing offsets for criteria pollutants, the City will develop a PM_{10} mitigation/community benefits package to ensure that the SFERP results in net benefits to public health in Southeast San Francisco. Additional features of the SFERP design that are intended to reduce impacts on public health are described below.

8.6.5.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the facility. BACT for the combustion turbine includes the combustion of natural gas.

The project will be required to offset NO_x emissions, and the City intends to offset both NO_x and POC emissions using local offsets to the greatest extent possible. In addition, the City will develop a PM_{10} mitigation/community benefits package.

8.6.5.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of natural gas as the only fuel at the proposed facility.

8.6.5.3 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in Subsection 8.12. Potential public health impacts from the use of hazardous materials are only expected to occur as a result of an accidental release. Construction risks will be minimized through compliance with Article 22A of the San Francisco Health Code (as described in subsection 8.13), Chapter 10 of the Environment Code and order 171,378 of the San Francisco Department of Public Works. As to operations, the plant has many safety features designed to prevent and minimize impacts from the use and accidental release of hazardous materials. The SFERP will include the following design features:

- Curbs, berms, and/or concrete pits will be provided where accidental release of chemicals may occur.
- A fire protection system will be included to detect, alarm, and suppress a fire, in accordance with the applicable LORS.
- Construction of the aqueous ammonia storage system will be in accordance with applicable LORS.

An RMP for the facility will be prepared prior to commencement of facility operations. The RMP will estimate the risk presented by handling ammonia at the facility. The RMP will include a hazard analysis, offsite consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on: (1) the proper use of personal protective equipment, (2) safety operating procedures, (3) fire safety, and (4) emergency response actions. The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for SFERP personnel include power plant evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either an oily waste collection sump or wastewater collection sumps. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

8.6.6 References

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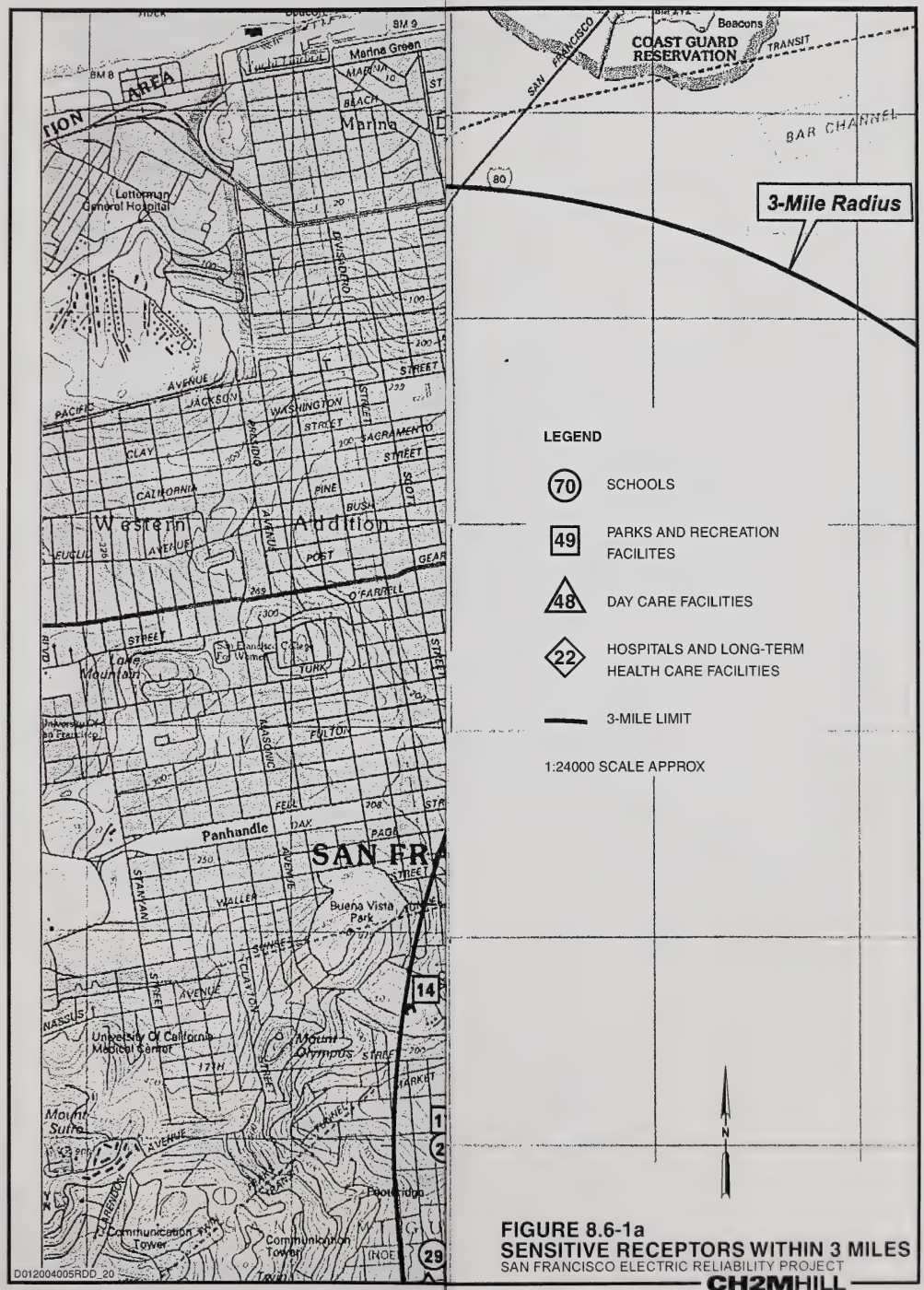


FIGURE 8.6-1a
SENSITIVE RECEPTORS WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
CH2MHILL



FIGURE 8.6-1a
SENSITIVE RECEPTORS WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
CH2MHILL

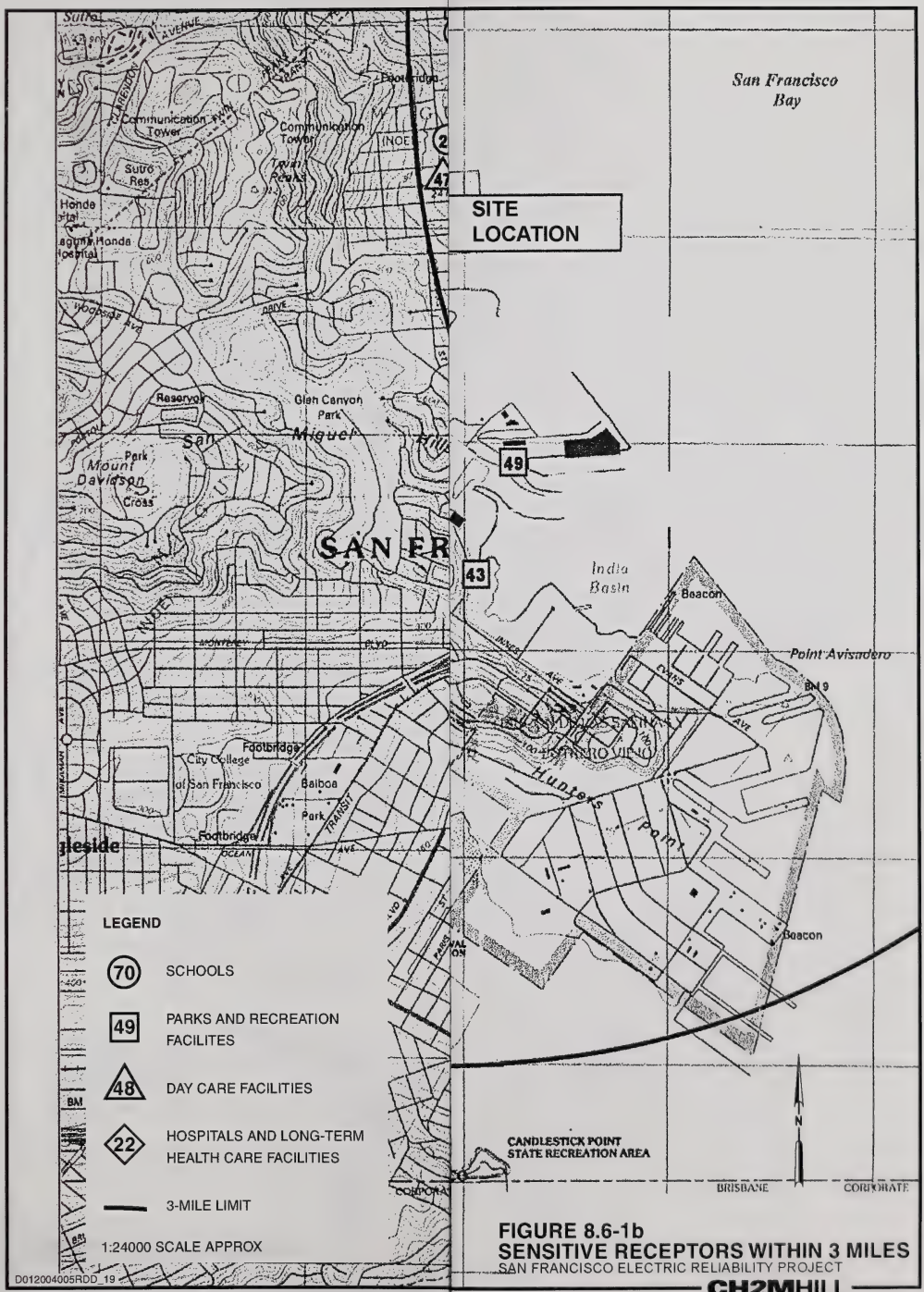


FIGURE 8.6-1b
SENSITIVE RECEPTORS WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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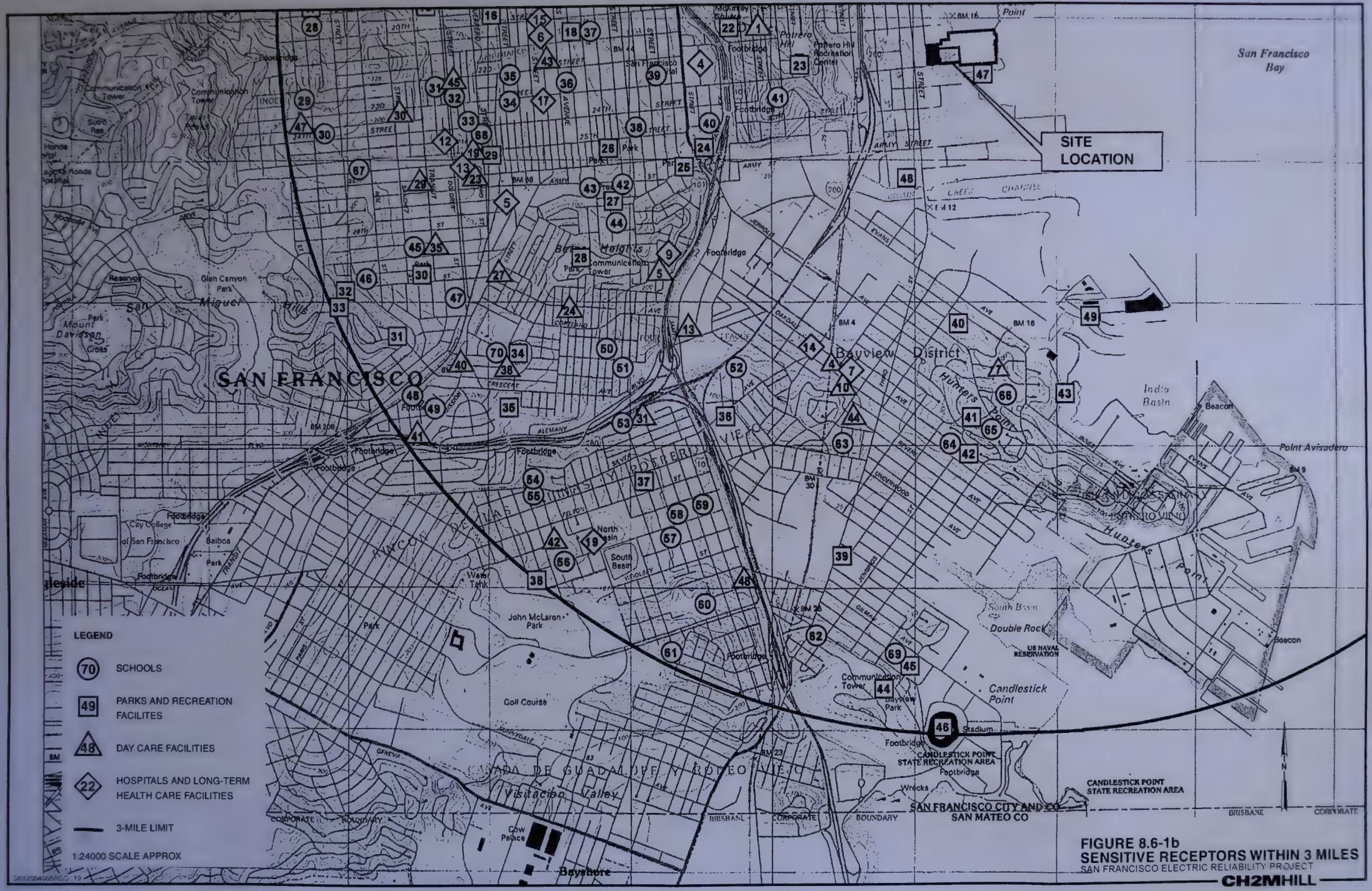


FIGURE 8.6-1b
SENSITIVE RECEPTORS WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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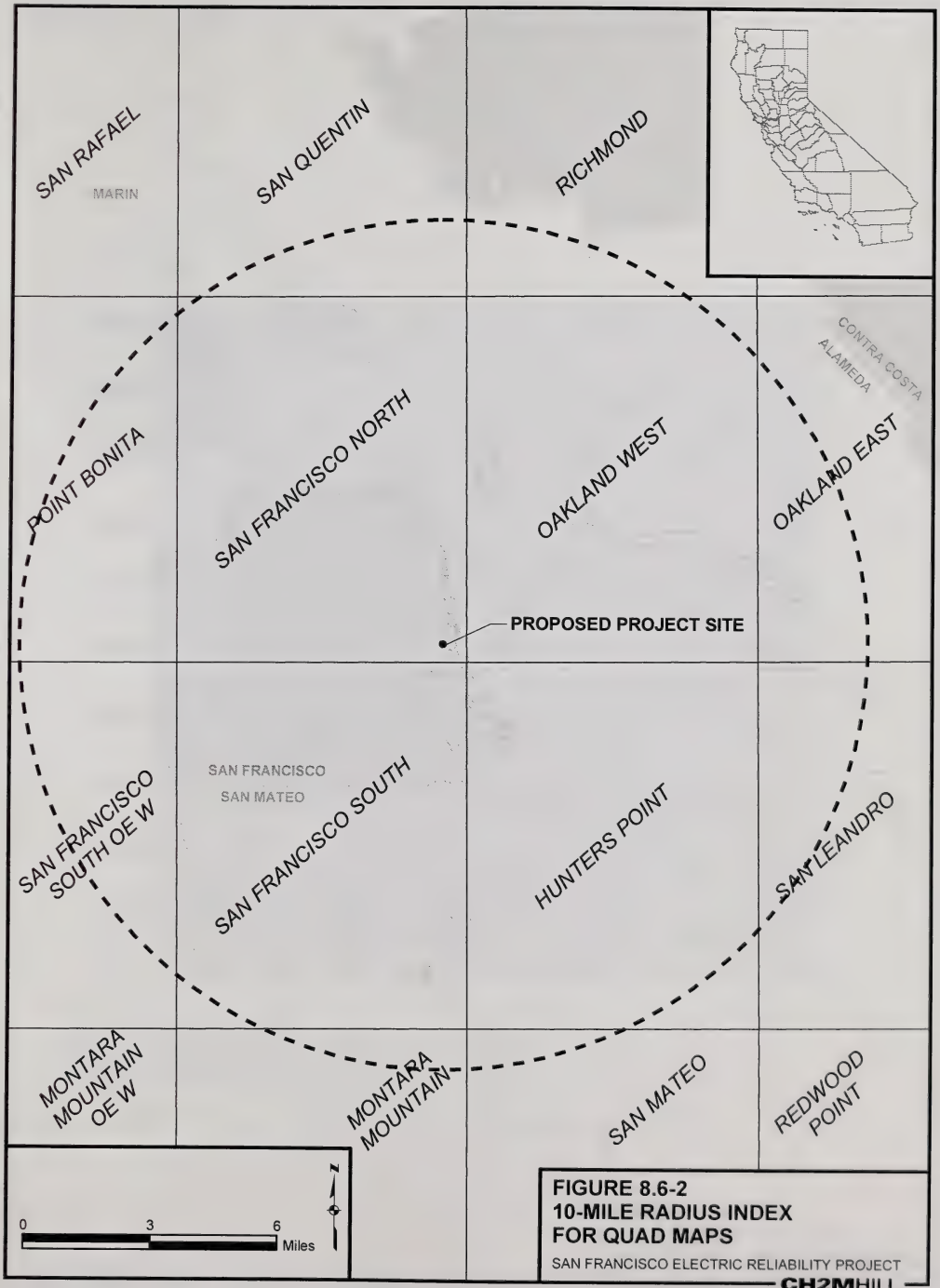
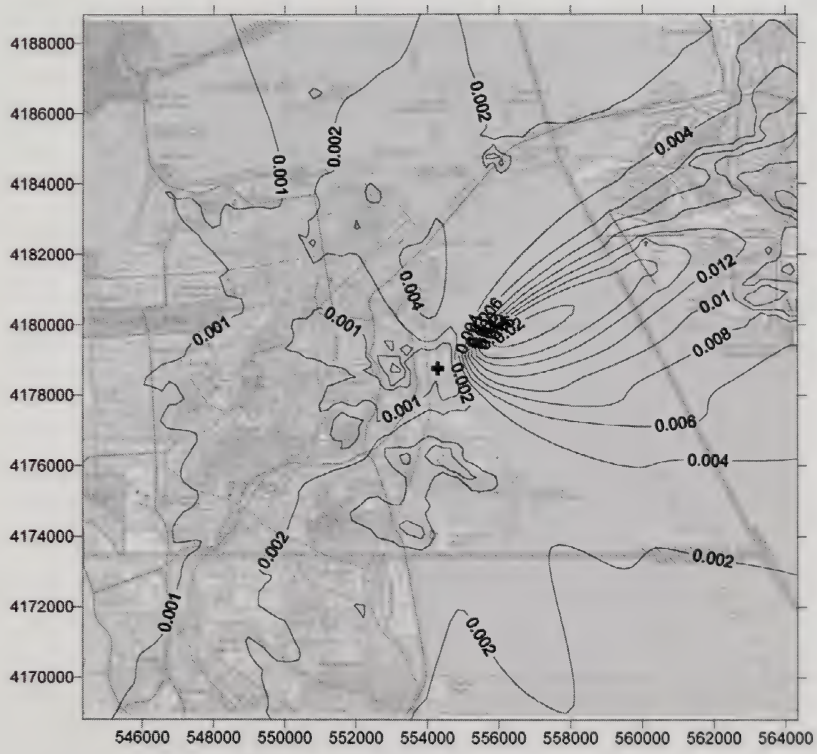


FIGURE 8.6-2
10-MILE RADIUS INDEX FOR QUAD MAPS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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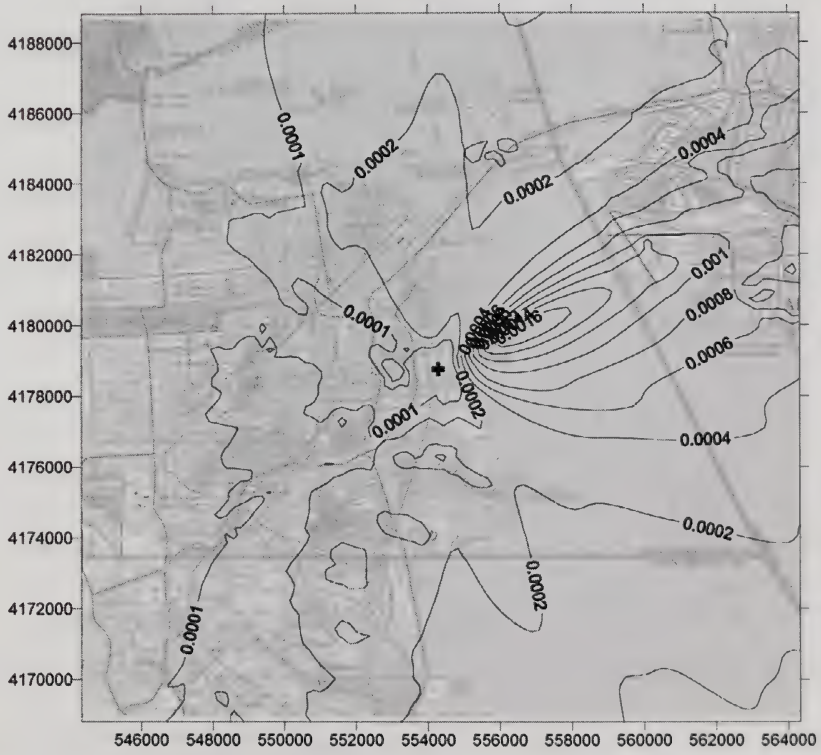


+ indicates project location
Maximum incremental cancer risk is 0.02 in one million
Significance threshold is 10 in one million

FIGURE 8.6-3a
INCREMENTAL LIFETIME CANCER RISK (IN ONE MILLION)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_31 (3/9/04)

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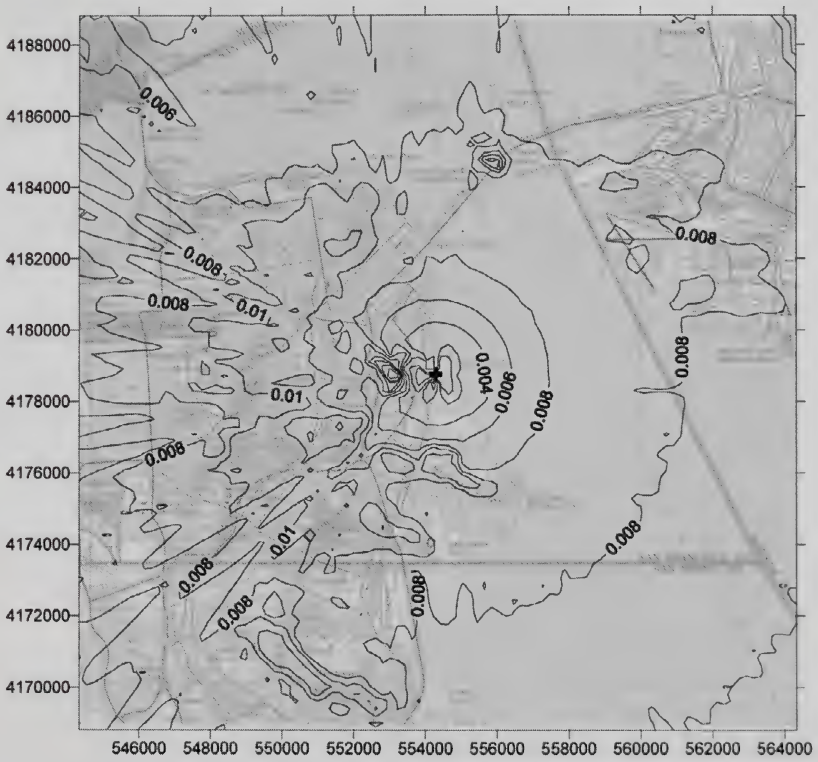


+ indicates project location
Maximum chronic health hazard index is 0.002
Significance threshold is 1.0

FIGURE 8.6-3b
CHRONIC HEALTH HAZARD INDEX
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_30 (3/9/04)

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+ indicates project location
Maximum acute health hazard index is 0.025
Significance threshold is 1.0

FIGURE 8.6-3c
ACUTE HEALTH HAZARD INDEX
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_29 (3/9/04)

CH2MHILL

SUBSECTION 8.7

Worker Health and Safety

8.7 Worker Health and Safety

8.7.1 Introduction

Subsection 8.7 summarizes the health and safety issues that may be encountered during the construction and operation of the proposed simple-cycle power plant. The proposed project is called the San Francisco Electric Reliability Project (SFERP) and is located adjacent to the San Francisco Bay in the Potrero District of the City of San Francisco (City), within the existing Potrero Power Plant (Potrero PP). The plant will consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired LM 6000 turbines and associated infrastructure and equipment.

This section contains worker safety information including the laws, ordinances, regulations, and standards (LORS) that apply to this project. It also contains separate sections outlining the safety training programs and general health and safety programs that will be prepared and implemented for this project, as well as information on the methods to control anticipated hazards, fire protection information, and general information on permitting agencies and contacts. Public health impacts are addressed in Subsection 8.6.

8.7.2 Laws, Ordinances, Regulations, and Standards

SFERP construction and operation will be conducted in accordance with all applicable LORS. Tables 8.7-1 through 8.7-4 summarize the LORS relating to worker health and safety. Table 8.7-1 provides a summary of federal LORS; Table 8.7-2 summarizes the state LORS; Table 8.7-3 lists the local (City and County of San Francisco) LORS; and Table 8.7-4 provides a summary of the applicable national consensus standards. Conformance for federal, state, and local LORS are discussed in Subsection 8.7.4.

TABLE 8.7-1
Federal LORS

Law, Ordinance, Regulation, or Standard	Applicability
Title 29 Code of Federal Regulations (CFR) Part 1910*	Contains the minimum occupational safety and health standards for general industry in the United States
Title 29 CFR Part 1926*	Contains the minimum occupational safety and health standards for the construction industry in the United States

* Primary laws and regulations governing worker health and safety in California are provided in Table 8.7-2. These regulations are for reference and apply as referenced by California occupational safety and health regulations. When a particular situation is not addressed by those regulations, the CFR will be consulted for guidance.

TABLE 8.7-2
State LORS

Law, Ordinance, Regulation, or Standard	Applicability
California Occupational Safety and Health Act, 1970	Establishes minimum safety and health standards for construction and general industry operations in California
8 California Code of Regulations (CCR) 339	Requires list of hazardous chemicals relating to the Hazardous Substance Information and Training Act
8 CCR 450	Addresses hazards associated with pressurized vessels
8 CCR 750	Addresses hazards associated with high-pressure steam
8 CCR 1509	Addresses requirements for construction, accident, and prevention plans
8 CCR 1509, et seq., and 1684, et seq.	Addresses construction hazards, including head, hand, and foot injuries and noise and electrical shock
8 CCR 1528, et seq., and 3380, et seq.	Requirements for personal protective equipment (PPE)
8 CCR 1597, et seq., and 1590, et seq.	Requirements addressing the hazards associated with traffic accidents and earth-moving
8 CCR 1604, et seq.	Requirements for construction hoist equipment
8 CCR 1620, et seq., and 1723, et seq.	Addresses miscellaneous hazards
8 CCR 1709, et seq.	Requirements for steel reinforcing, concrete pouring, and structural steel erection operations
8 CCR 1920, et seq.	Requirements for fire protection systems
8 CCR 2300, et seq., and 2320, et seq.	Requirements for addressing low-voltage electrical hazards
8 CCR 2395, et seq.	Addresses electrical installation requirements
8 CCR 2700, et seq.	Addresses high-voltage electrical hazards
8 CCR 3200, et seq., and 5139, et seq.	Requirements for control of hazardous substances
8 CCR 3203, et seq.	Requirements for operational accident prevention programs
8 CCR 3270, et seq., and 3209, et seq.	Requirements for evacuation plans and procedures
8 CCR 3301, et seq.	Requirements for addressing miscellaneous hazards, including hot pipes, hot surfaces, compressed air systems, relief valves, enclosed areas containing flammable or hazardous materials, rotation equipment, pipelines, and vehicle-loading dock operations
8 CCR 3360, et seq.	Addresses requirements for sanitary conditions
8 CCR 3511, et seq., and 3555, et seq.	Requirements for addressing hazards associated with stationary engines, compressors, and portable, pneumatic, and electrically powered tools
8 CCR 3649, et seq., and 3700, et seq.	Requirements for addressing hazards associated with field vehicles

TABLE 8.7-2
State LORS

Law, Ordinance, Regulation, or Standard	Applicability
8 CCR 3940, et seq.	Requirements for addressing hazards associated with power transmission, compressed air, and gas equipment
8 CCR 5109, et seq.	Requirements for addressing construction accident and prevention programs
8 CCR 5110, et seq.	Requirements for the implementation of an ergonomics program
8 CCR 5139, et seq.	Requirements for addressing hazards associated with welding, sandblasting, grinding, and spray-coating
8 CCR 5150, et seq.	Requirements for confined space entry
8 CCR 5160, et seq.	Requirements for addressing hot, flammable, poisonous, corrosive, and irritant substances
8 CCR 5192, et seq.	Requirements for conducting emergency response operations
8 CCR 5193, et seq.	Requirements for controlling employee exposure to bloodborne pathogens associated with exposure to raw sewage water and body fluids associated with first aid/CPR duties
8 CCR 5194, et seq.	Requirements for employee exposure to dusts, fumes, mists, vapors, and gases
8 CCR 5405, et seq.; 5426, et seq.; 5465, et seq.; 5500, et seq.; 5521, et seq.; 5545, et seq.; 5554, et seq.; 5565, et seq.; 5583, et seq.; and 5606, et seq.	Requirements for flammable liquids, gases, and vapors
8 CCR 5583, et seq.	Requirements for design, construction, and installation of venting, diking, valving, and supports
8 CCR 6150, et seq.; 6151, et seq.; 6165, et seq.; 6170, et seq.; and 6175, et seq.	Fire protection requirements
Title 24, Part 3, California Electrical Code	The Cal/OSHA electrical safety regulations incorporate the requirements of the Uniform Electrical Code located in Title 24, Part 3
8 CCR, Part 6	Provides health and safety requirements for working with tanks and boilers
Health and Safety Code Section 25531, et seq.	Requires that every new or modified facility that handles, treats, stores, or disposes of more than the threshold quantity of any of the listed regulated materials prepare and maintain a Risk Management Plan (RMP)
Health and Safety Code Sections 25500 through 25541	Requires the preparation of a Hazardous Material Business Plan (HMBP) that details emergency response plans for a hazardous materials emergency at the facility

TABLE 8.7-3
Local Laws, Ordinances, Regulations, and Standards Required by San Francisco County

Law, Ordinance, Regulation, or Standard	Applicability
Specific hazardous material handling requirements	Provides response agencies with necessary information to address emergencies
Emergency Response Plan	Allows response agency to integrate SFERP emergency response activities into any response actions
Business Plan	Provides response agency with overview of SFERP purpose and operations
Risk Management Plan (Certified Unified Program Agency [CUPA], administered by the County)	Provides response agency with detailed review of risks and hazards located at SFERP and mitigation implemented to control risks or hazards
Unreinforced Masonry Buildings (UMB), CCSF Building Code, Chapters 16B and 16C	Requires owners of unreinforced masonry buildings to have a structural analysis and if the building does not meet the minimum standards of the code and the exceptions, then the owner will structurally alter the building to conform to the code or have the building demolished

TABLE 8.7-4
Applicable National Consensus Standards

Law, Ordinance, Regulation, or Standard	Applicability
Uniform Fire Code, Article 80	Addresses the prevention, control, and mitigation of dangerous conditions related to storage, dispensing, use, and handling of hazardous materials and information needed by emergency response personnel
National Fire Protection Association (NFPA) 10, Standard for Portable Fire Extinguishers	Requirements for selection, placement, inspection, maintenance, and employee training for portable fire extinguishers
NFPA 11, Standard for Low-Expansion Foam and Combined Agent Systems	Requirements for installation and use of low-expansion foam and combined-agent systems
NFPA 11A, Standard for Medium- and High-Expansion Foam Systems	Requirements for installation and use of medium- and high-expansion foam systems
NFPA 12, Standard on Carbon Dioxide Extinguishing Systems	Requirements for installation and use of carbon dioxide extinguishing systems
NFPA 13, Standard for Installation of Sprinkler Systems	Guidelines for selection and installation of fire sprinkler systems
NFPA 13A, Recommended Practice for the Inspection, Testing, and Maintenance of Sprinkler Systems	Guidance for inspection, testing, and maintenance of sprinkler systems
NFPA 14, Standard for the Installation of Standpipe and Hose Systems	Guidelines for selection and installation of standpipe and hose systems

TABLE 8.7-4
Applicable National Consensus Standards

Law, Ordinance, Regulation, or Standard	Applicability
NFPA 15, Standard for Water Spray Fixed Systems	Guidelines for selection and installation of water spray fixed systems
NFPA 17, Standard for Dry Chemical Extinguishing Systems	Guidance for selection and use of dry chemical extinguishing systems
NFPA 20, Standard for the Installation of Centrifugal Fire Pumps	Guidance for selection and installation of centrifugal fire pumps
NFPA 22, Standard for Water Tanks for Private Fire Protection	Requirements for water tanks for private fire protection
NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances	Requirements for private fire service mains and their appurtenances
NFPA 26, Recommended Practice for the Supervision of Valves Controlling Water Supplies	Supervision guidance for valves controlling water supplies
NFPA 30, Flammable and Combustible Liquid Code	Requirements for storage and use of flammable and combustible liquids
NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	Fire protection requirements for installation and use of combustion engines and gas turbines
NFPA 50A, Standard for Gaseous Hydrogen Systems at Consumer Sites	Fire protection requirements for hydrogen systems
NFPA 54, National Fuel Gas Code	Fire protection requirements for use of fuel gases
NFPA 59A, Standard for the Storage and Handling of Liquefied Petroleum Gases	Requirements for storage and handling of liquefied petroleum gases
NFPA 68, Guide for Explosion Venting	Guidance in design of facilities for explosion venting
NFPA 70, National Electric Code	Guidance on safe selection and design, installation, maintenance, and construction of electrical systems
NFPA 70B, Recommended Practice for Electrical Equipment Maintenance	Guidance on electrical equipment maintenance
NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces	Employee safety requirements for working with electrical equipment
NFPA 71, Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems	Requirements for installation, maintenance, and use of central station signaling systems
NFPA 72A, Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm and Supervisory Service	Requirements for installation, maintenance, and use of local protective signaling systems
NFPA 72E, Standard on Automatic Fire Detection	Requirements for automatic fire detection
NFPA 72F, Standard for the Installation, Maintenance and Use of Emergency Voice/Alarm of Communication Systems	Requirements for installation, maintenance, and use of emergency and alarm communications systems
NFPA 72H, Guide for Testing Procedures for Local, Auxiliary, Remote Station and Proprietary Protective Signaling Systems	Testing procedures for types of signaling systems anticipated for facility

TABLE 8.7-4
Applicable National Consensus Standards

Law, Ordinance, Regulation, or Standard	Applicability
NFPA 75, Standard for the Protection of Electronic Computer/Data Processing Equipment	Requirements for fire protection systems used to protect computer systems
NFPA 78, Lightning Protection Code	Lightning protection requirements
NFPA 80, Standard for Fire Doors and Windows	Requirements for fire doors and windows
NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems	Requirements for installation of air conditioning and ventilating systems
NFPA 101, Code for Safety to Life from Fire in Buildings and Structures	Requirements for design of means of exiting the facility
NFPA 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants	Guidelines for testing and marking of fire hydrants
NFPA 850, Recommended Practice for Fire Protection for Fossil Fuel Steam Electric Generating Plants	Requirements for fire protection in fossil-fuel steam electric generating plants
NFPA 1961, Standard for Fire Hose	Specifications for fire hoses
NFPA 1962, Standard for the Care, Maintenance, and Use of Fire Hose Including Connections and Nozzles	Requirements for care, maintenance, and use of fire hose
NFPA 1963, Standard for Screw Threads and Gaskets for Fire Hose Connections	Specifications for fire hose connections
American National Standards Institute/American Society for Mechanical Engineers (ANSI/ASME), Boiler and Pressure Vessel Code	Specifications and requirements for pressure vessels
ANSI, B31.2, Fuel Gas Piping	Specifications and requirements for fuel gas piping

8.7.3 Setting

The project will consist of installing and operating three General Electric LM 6000 Sprint Combustion Turbine Generators (CTGs) equipped with water injection to control oxides of nitrogen (NO_x) emissions. Associated equipment will include a two-cell cooling tower for the inlet air chillers and the necessary emission control systems to meet the proposed air emission limits. Each CTG will generate a nominal 48 MW at Independent System Operator (ISO) conditions.

The plant site is currently part of the Potrero PP site (formerly owned by PG&E) with numerous abandoned power plant buildings. The power plant equipment previously located at the site has been removed. In order to construct the proposed power plant, two buildings will be demolished to make room for the new power plant equipment and associated buildings.

8.7.4 Impacts

8.7.4.1 Environmental Checklist

Impacts would generally be evaluated with respect to the California Environmental Quality Act (CEQA) checklist. The CEQA checklist does not have specific questions for worker health and safety. Related questions are addressed in the Hazardous Materials Management and Noise subsections.

8.7.4.2 Discussion of Impacts

During this project, workers will be exposed to construction safety hazards and plant operation safety hazards. To evaluate these hazards and assess control measures, a hazard analysis has been prepared. The analysis identifies the hazards anticipated during construction and operation, and indicates which safety programs should be developed and implemented to mitigate and appropriately manage those hazards. The hazard analysis prepared for construction activities is outlined in Table 8.7-5; the hazard analysis prepared for plant operation is outlined in Table 8.7-6. Since the types of hazards anticipated during plant construction and operation are similar, there is considerable duplication between the tables.

Overview of Hazards and Related Programs and Training. Programs are overall plans that set forth the method or methods that will be followed to achieve particular health and safety objectives. For example, the Fire Protection and Prevention Program will describe what has to be done to protect against and prevent fires. This will include equipment required, such as alarm systems and firefighting equipment, and procedures to follow to protect against fires. The Emergency Action Program/Plan will describe escape procedures, rescue and medical procedures, alarm and communication systems, and response procedures for every hazardous material that can migrate, such as ammonia. The programs or plans are set forth in written documents that are usually kept at specific locations within the facility.

Each program or plan will contain training requirements that are translated into detailed training courses. These courses are taught to plant construction and operating personnel, as needed. For example, all plant operating personnel will receive training in escape procedures under the Emergency Action Program/Plan, but only those working with flammables will receive training under the Fire Protection and Prevention Program.

Tables 8.7-5 and 8.7-6, which list construction and operation activities and associated hazards, also show (under the "Control" column) the program designed to reduce the occurrence of each hazard.

TABLE 8.7-5
Construction Hazard Analysis

Activity	Hazard*	Control*
Motor vehicle and heavy equipment use	Employee injury and property damage from collisions between people and equipment	Motor Vehicle and Heavy Equipment Safety Program
Forklift operation	Same as heavy equipment	Forklift Operation Program

TABLE 8.7-5
Construction Hazard Analysis

Activity	Hazard*	Control*
Trenching and excavation	Employee injury and property damage from the collapse of trenches and excavations	Excavation/Trenching Program
Working at elevated locations	Falls from the same level and elevated areas	Fall Prevention Program Scaffolding/Ladder Safety Program Articulating Boom Platforms Program
Use of cranes and derricks	Property damage from falling loads; employee injuries from falling loads; and injuries and property damage from contact with crane or derrick	Crane and Material Handling Program
Working with flammable and combustible liquids	Fire/spills	Fire Protection and Prevention Program; Housekeeping and Material Handling and Storage Program
Hot work (including cutting and welding)	Employee injury and property damage from fire; exposure to fumes during cutting and welding; ocular exposure to ultraviolet and infrared radiation during cutting and welding	Hot Work Safety Program; Respiratory Protection Program; Employee Exposure Monitoring Program; Personal Protective Equipment Program
Demolition of existing structures	Employee injury and property damage associated with falling objects, crushing hazards, and exposure to underground and aboveground utilities	Demolition Safety Procedure
Inspection and maintenance of temporary systems used during construction activities	Employee injury and property damage from contact with hazardous energy sources (electrical, thermal, mechanical, etc.)	Electrical Safety Program
Working on electrical equipment and systems	Employee contact with live electricity and energized equipment	Electrical Safety Program; Personal Protective Equipment Program
Exposure to Hazardous Waste	Personnel who are working with or have the potential to be exposed to contaminated soil, groundwater, or debris during construction	Hazardous Waste Program
Confined space entry	Employee injury from physical and chemical hazards	Permit-Required; Confined-Space Entry Program
General construction activity	Employee injury from hand and portable power tools	Hand and Portable Power Tool Safety Program; Personal Protective Equipment Program
General construction activity	Employee injury/property damage from inadequate walking and work surfaces	Housekeeping and Material Handling and Storage Program

TABLE 8.7-5
Construction Hazard Analysis

Activity	Hazard*	Control*
General construction activity	Employee exposure to occupational noise	Hearing Conservation Program Personal Protective Equipment Program
General construction activity	Employee injury from improper lifting and carrying of materials and equipment	Back Injury Prevention Program
General construction activity	Employee injury to head, eye/face, hand, body, foot, and skin	Personal Protective Equipment Program
General construction activity	Employee exposure to hazardous gases, vapors, dusts, and fumes	Hazard Communication Program; Respiratory Protection Program; Personal Protective Equipment Program; Air Monitoring Program
General construction activity	Employee exposure to various hazards; reporting of hazardous conditions during construction	Injury and Illness Prevention Program
General construction activity	Heat and cold stress	Heat and Cold Stress Monitoring and Control Program
Construction and testing of high-pressure steam and air systems	Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	Pressure Vessel and Pipeline Safety Program; Electrical Safety Program

* The hazards and hazard controls provided are generic to construction activities. During various phases of construction, a hazard analysis will be performed to more specifically evaluate the relevant hazards and to develop appropriate controls.

TABLE 8.7-6
Operation Hazard Analysis

Activity	Hazard*	Control*
Motor vehicle and heavy equipment use	Employee injury and property damage from collisions between people and equipment	Motor Vehicle and Heavy Equipment Safety Program
Forklift operations	Same as heavy equipment	Forklift Operation Program
Trenching and excavation	Employee injury and property damage from the collapse of trenches and excavations	Excavation/Trenching Program
Working at elevated locations	Falls from the same level and elevated areas	Fall Protection Program; Scaffolding/Ladder Safety Program

TABLE 8.7-6
Operation Hazard Analysis

Activity	Hazard*	Control*
Use of cranes or derricks	Property damage from falling loads, employee injuries from falling loads, injuries and property damage from contact with crane or derrick	Crane and Material Handling Program
Working with flammable and combustible liquids	Fire/spills	Fire Protection and Prevention Program
Working with hazardous materials	Employee injury due to ingestion, inhalation, dermal contact	Hazard Communication Program
Hot work (including cutting and welding)	Employee injury and property damage from fire; exposure to fumes during cutting and welding; ocular exposure to ultraviolet and infrared radiation during cutting and welding	Hot Work Safety Program; Respiratory Protection Program; Employee Exposure Monitoring Program; Personal Protective Equipment Program; Fire Protection and Prevention Program
Troubleshooting and maintenance of plant systems and general operational activities	Employee injury and property damage from contact with hazardous energy sources (electrical, thermal, mechanical, etc.)	Electrical Safety Program
Working on electrical equipment and systems	Employee contact with live electricity	Electrical Safety Program; Personal Protective Equipment Program
Confined space entry	Employee injury from physical and chemical hazards	Permit-Required; Confined-Space Entry Program
General plant operation activities	Employee injuries from hand and portable power tools	Hand and Portable Power Tool Safety Program; Personal Protective Equipment Program
General plant operation activities	Employee injury and property damage from inadequate walking and work surfaces	Housekeeping and Material Handling and Storage Program
General plant operation activities	Employee overexposure to occupational noise	Hearing Conservation Program; Personal Protective Equipment Program
General plant operation activities	Employee injury from improper lifting and carrying of materials and equipment	Back Injury Prevention Program
General plant operation activities	Employee injury and property damage from unsafe driving	Safe Driving Program
General plant operation activities	Employee overexposure to hazardous gases, vapors, dusts, and fumes	Hazard Communication Program; Respiratory Protection Program; Personal Protective Equipment Program; Employee Exposure Monitoring Program
General plant operation activities	Reporting and repair of hazardous conditions	Injury and Illness Prevention Program
General plant operation activities	Heat and cold stress	Heat and Cold Stress Monitoring and Control Program

TABLE 8.7-6
Operation Hazard Analysis

Activity	Hazard*	Control*
General plant operation activities	Ergonomic injuries	Ergonomic Awareness Program
Maintenance and repair of high-pressure steam and air systems	Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	Pressure Vessel and Pipeline Safety Program; Electrical Safety Program
Ammonia storage	Ammonia release	Emergency Action Program/Plan; Risk Management Plan (see Subsection 8.12)

* The hazard and hazard controls provided are generic to operational activities. This hazard analysis may have to be updated if plant operations change or new equipment is added that was not considered during this evaluation.

8.7.4.3 Health and Safety Programs

To protect the safety and health of workers during the construction and operation of the SFERP, health and safety programs designed to mitigate hazards and comply with applicable regulations will be implemented. Periodic audits will be performed by qualified individuals to determine whether proper work practices are being used to mitigate hazardous conditions and to evaluate regulatory compliance.

The following subsections contain information on the anticipated content of the health and safety programs.

8.7.4.3.1 Construction Health and Safety Program. The following construction safety programs will be developed and implemented during construction of the SFERP as outlined in the following lists.

Injury and Illness Prevention Program

- Philosophy and safety commitment
- Safety leadership and responsibilities
- Accountability
- Specific core safety processes (see Construction Safety Programs later in this section)
- Employee communication
- Planning "job hazard analysis and pre-task"
- Compliance with work rules and safe work practices
- Measurement of compliance and effectiveness of prevention methods
- Communication of performance and implementation of necessary improvements
- Training and other communication requirements

Fire Protection and Prevention Program

- General requirements
- Housekeeping and proper material storage
- Employee alarm/communication system
- Portable fire extinguishers
- Fixed firefighting equipment
- Fire control and containment

- Flammable and combustible liquid storage
- Dispensing and disposal of flammable liquids
- Service and refueling areas
- Training

Personal Protective Equipment Program

- Personal protective devices
- Head protection
- Eye/face protection
- Body protection
- Hand protection
- Foot protection
- Skin protection
- Fall protection
- High-voltage protection
- Respiratory protection
- Hearing protection
- Hazard analysis
- Training

Emergency Action Program/Plan

Emergency procedures for the protection of personnel, equipment, the environment, and materials:

- Fire and emergency reporting procedures
- Response actions for accidents involving personnel and/or property
- Bomb threat response procedures
- Site assembly and emergency evacuation route procedures
- Natural disasters response

Reporting and notification procedures for emergencies and contacts, including offsite and local authorities:

- Alarm and communication systems
- Spill response, prevention, and control action plan
- Emergency response equipment
- Emergency personnel (response team) responsibilities and notification roster
- Training requirements

Construction Safety Programs

Motor Vehicle and Heavy Equipment Safety Program

- Operation and maintenance of vehicles
- Inspection
- Personal Protective Equipment (PPE)
- Training

Forklift Operation Program

- Trained and certified operators
- Fueling operations

- Safe operating parameters
- Training

Excavation/Trenching Program
- Shoring, sloping, and benching requirements
- California Occupational Safety and Health Administration (Cal-OSHA) permit requirements
- Inspection
- Air monitoring
- Access and egress

Fall Protection Program
- Evaluation of fall hazards
- Protection devices
- Training

Scaffolding/Ladder Safety Program
- Construction and inspection of equipment
- Proper use
- Training

Articulating Boom Platforms Program
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Operator training

Crane and Material Handling Program
- Certified and licensed operators
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Training

Hazardous Waste Program
- Evaluation of hazard
- Training
- Air monitoring
- Medical surveillance
- Health and Safety Plan (HSP) preparation

Hot Work Safety Program
- Welding and cutting procedures
- Fire watch
- Hot work permit
- PPE
- Training

Employee Exposure Monitoring Program
- Exposure evaluation
- Monitoring requirements

- Reporting of results
- Medical surveillance
- Training

Electrical Safety Program
- Grounding procedure
- Lock-out/tag-out (LO/TO) procedures
- Overhead and underground utilities
- Utility clearance
- Training

Permit-Required Confined Space Entry Program
- Air monitoring and ventilation requirements
- Rescue procedures
- LO/TO and blocking, blinding, and blanking requirements
- Permit completion
- Training

Hand and Portable Power Tool Safety Program
- Guarding and proper operation
- Training

Housekeeping and Material Handling and Storage Program
- Storage requirements
- Walkways and work surfaces
- Equipment handling requirements
- Training

Hearing Conservation Program
- Identifying high-noise environments
- Exposure monitoring
- Medical surveillance requirements
- Hearing-protective devices
- Training

Back Injury Prevention Program
- Proper lifting and material handling procedures
- Training

Hazard Communication Program
- Labeling requirements
- Storage and handling
- Material Safety Data Sheets (MSDS)
- Chemical inventory
- Training

Respiratory Protection Program
- Selection and use
- Storage

- Fit testing
- Medical requirements
- Inspection and repair
- Training

Heat and Cold Stress Monitoring and Control Program
- Monitoring requirements
- Prevention and control

Pressure Vessel and Pipeline Safety Program
- Line-breaking program
- Equipment inspection and maintenance
- Blocking, bleeding, and blanking
- Training

Demolition Procedure (If applicable)
- Utility clearance and certification of disconnection
- Demolition sequence
- Permits required (if applicable)
- Competent person
- Training

8.7.4.3.2 Operations Health and Safety Program. Upon completion of construction and commencement of operations at SFERP, the construction safety and health program will transition into an operations-oriented program reflecting the hazards and controls necessary during operation. The following outline sets forth the topics that will be included in the Operations Health and Safety Program.

Injury and Illness Prevention Program
- Personnel with the responsibility and authority for implementing the plan
- Safety and health policy
- Work rules and safe work practices
- System for ensuring that employees comply with safe work practices
- Employee communications
- Identification and evaluation of workplace hazards
- Methods and/or procedures for correcting unsafe or unhealthy conditions, work practices, and work procedures in a timely manner based on the severity of the hazards
- Specific safety procedures (see Plant Operation Safety Program)
- Training and instruction

Fire Protection and Prevention Program
- General requirements
- Fire hazard inventory, including ignition sources and mitigation
- Housekeeping and proper materials storage
- Employee alarm/communication system
- Portable fire extinguishers
- Fixed firefighting equipment
- Fire control

- Flammable and combustible liquid storage
- Use of flammable and combustible liquids
- Dispensing and disposal of liquids
- Training
- Personnel to contact for information on plan contents

Emergency Action Program/Plan (Part of the Risk Management Plan)

- Emergency escape procedures and emergency escape route assignments
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
- Procedures to account for all employees after emergency evacuation has been completed
- Rescue and medical duties for those employees performing rescue and medical duties
- Fire and emergency reporting procedures
- Alarm and communication system
- Personnel to contact for information on plan contents
- Response procedure for ammonia release
- Training requirements

Personal Protective Equipment Program

- Hazard analysis and prescription of PPE
- Personal protective devices
- Head protection
- Eye and face protection
- Body protection
- Hand protection
- Foot protection
- Skin protection
- Sanitation
- Safety belts and life lines for fall protection
- Protection for electric shock
- Medical services and first aid/bloodborne pathogens
- Respiratory protective equipment
- Hearing protection
- Training

Plant Operation Safety Program

Motor Vehicle and Heavy Equipment Safety Program

- Operation and maintenance of vehicles
- Inspection
- Personal protective equipment
- Training

Forklift Operation Program

- Trained and certified operators
- Fueling operations
- Safe operating parameters
- Training

Excavation/Trenching Program
- Shoring, sloping, and benching requirements
- Cal-OSHA permit requirements
- Inspection
- Air monitoring
- Access and egress

Fall Protection Program
- Evaluation of fall hazards
- Protection devices
- Training

Scaffolding/Ladder Safety Program
- Construction and inspection of equipment
- Proper use
- Training

Articulating Boom Platforms Program
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Operator training

Crane and Material Handling Program
- Certified and licensed operators
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Training

Hot Work Safety Program
- Welding and cutting procedures
- Fire watch
- Hot work permit
- PPE
- Training

Workplace Ergonomics Program
- Identification of personnel at risk
- Evaluation of personnel
- Workplace and job activity modifications
- Training

Employee Exposure Monitoring Program
- Exposure evaluation
- Monitoring requirements
- Reporting of results
- Medical surveillance
- Training

Electrical Safety Program
- Grounding procedure
- LO/TO procedures
- Overhead and underground utilities
- Utility clearance
- Training

Permit-Required Confined Space Entry Program
- Air monitoring and ventilation requirements
- Rescue procedures
- LO/TO and blocking, blinding, and blanking requirements
- Permit completion
- Training

Hand and Portable Power Tool Safety Program
- Guarding and proper operation
- Training

Housekeeping and Material Handling and Storage Program
- Storage requirements
- Walkways and work surfaces
- Equipment handling requirements
- Training

Hearing Conservation Program
- Identifying high-noise environments
- Exposure monitoring
- Medical surveillance requirements
- Hearing-protective devices
- Training

Back Injury Prevention Program
- Proper lifting and material-handling procedures
- Training

Hazard Communication Program
- Labeling requirements
- Storage and handling
- MSDS
- Chemical inventory
- Training

Respiratory Protection Program
- Selection and use
- Storage
- Fit testing
- Medical requirements
- Inspection and repair
- Training

Heat and Cold Stress Monitoring and Control Program
- Monitoring requirements
- Prevention and control

Pressure Vessel and Pipeline Safety Program
- Line-breaking policy
- Equipment inspection and maintenance
- Blocking, bleeding, and blanking
- Communication
- Training

Safe Driving Program
- Inspection and maintenance
- Training

8.7.4.4 Safety Training Programs

To ensure that employees recognize and understand how to protect themselves from potential hazards during this project, comprehensive training programs for construction and operation will be implemented as indicated in Tables 8.7-7 and 8.7-8. Each of the safety procedures developed to control and mitigate potential site hazards will require some form of training. Training will be delivered in various ways, depending on the requirements of Cal-OSHA standards, the complexity of the topic, the characteristics of the workforce, and the degree of risk associated with each of the identified hazards.

Tables 8.7-7 and 8.7-8 summarize the safety training programs that will be provided to construction and operations personnel, respectively.

TABLE 8.7-7
Construction Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All
Emergency Action Program/Plan	All
Personal Protective Equipment Training	All
Motor Vehicle and Heavy Equipment Safety Training	Employees working on, near, or with heavy equipment or vehicles
Forklift Operation Training	Employees operating forklifts
Excavation/Trenching Safety Training	Employees involved with trenching or excavation
Fall Protection Training	Employees working at heights greater than 6 feet or required to use fall protection
Scaffolding/Ladder Safety Training	Employees required to erect or use scaffolding
Crane Safety Training	Employees supervising or performing crane operations
Fire Protection and Prevention Training	Employees responsible for the handling and storage of flammable or combustible liquids or gases
Hazard Communication Training	Employees handling or working with hazardous materials

TABLE 8.7-7
Construction Training Program

Training Course	Target Employees
Hazardous Waste	Employees handling or excavating hazardous waste
Hot Work Safety Training	Employees performing hot work
Electrical Safety Training	Employees performing LO/TO or working on systems that require LO/TO activities
Electrical Safety Training	Employees required to work on electrical systems and equipment, or use electrical equipment and cords
Permit-Required Confined-Space Entry Training	Employees required to supervise or perform confined-space entry activities
Hand and Portable Power Tool Safety Training	Employees that will be operating hand and portable power tools
Heat Stress and Cold Stress Safety Training	Employees that are exposed to temperature extremes
Hearing Conservation Training	All
Back Injury Prevention Training	All
Safe Driving Training	Employees supervising or driving motor vehicles
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized systems or equipment
Respiratory Protection Training	All employees required to wear respiratory protection
Fire Protection and Prevention Training	All

TABLE 8.7-8
Operations Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All
Emergency Action Plan	All
Personal Protective Equipment Training	All
Excavation/Trenching Safety Training	Employees involved with trenching or excavation
Scaffolding/Ladder Safety Training	Employees required to erect or use scaffolding
Fall Protection Training	Employees required to use fall protection
Forklift Operator Training	Employees operating forklifts
Crane Safety Training	Employees supervising or performing crane operations
Workplace Ergonomics	Employees performing repetitive activities
Fire Protection and Prevention Training	Employees responsible for the handling and storage of flammable or combustible liquids or gasses

TABLE 8.7-8
Operations Training Program

Training Course	Target Employees
Hot Work Safety Training	Employees performing hot work
Electrical Safety Training	Employees performing lock out/tag out
Electrical Safety	Employees required to work on electrical systems and equipment
Permit-Required Confined-Space Entry	Employees required to supervise or perform confined-space entry
Hand and Portable Power Tool Safety Training	Employees that will be operating hand and portable power tools
Heat Stress and Cold Stress Safety Training	Employees exposed to temperature extremes
Hearing Conservation Training	All
Back Injury Prevention Training	All
Safe Driving Training	Employees supervising or driving motor vehicles
Hazard Communication Training	Employees handling or working around hazardous materials
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized systems or equipment
Respiratory Protection Program	All employees required to wear respiratory protection
Fire Protection and Prevention Training	All

8.7.4.5 Fire Protection

Three fire stations are located in the immediate vicinity of the project site and would all respond in the event of a fire emergency. Each station is located within 2 miles of the project site and have a response time of 4 to 6 minutes.

8.7.5 Involved Agencies and Agency Contacts

Several agencies are involved to ensure protection of worker health and safety. Agency contacts relative to worker health and safety and fire are shown in Table 8.7-9.

TABLE 8.7-9
Agency Contacts

Agency	Contact Name/Position	Address and Telephone
SFFD Station 37	Captain Mark Groshong	789 Wisconsin Street San Francisco, CA 94102 (415) 558-3237
SFFD Station 25	Captain Mark Johnson	3305 3rd Street San Francisco, CA 94124 (415) 558-3225

TABLE 8.7-9
Agency Contacts

Agency	Contact Name/Position	Address and Telephone
SFFD Station 9	Battalion Chief – Bob Serrano	2245 Jerrold Street San Francisco, CA 94125 (415) 558-3209
Environmental Protection Agency	Duty Officer	75 Hawthorne Street San Francisco, CA 94105 (415) 744-1500
Department of Toxic Substance Control	Duty Officer	700 Heinz Avenue Suite 200 Berkeley, CA 94710-2721 (510) 540-2122
Cal-OSHA Consultation—San Francisco Bay Area	Duty Officer	1515 Clay Street Suite 1103 Oakland, CA 94612 (510) 622-2891

8.7.6 Permits Required and Permit Schedule

Table 8.7-10 lists applicable permits related to the protection of worker health and safety for SFERP certification. The activities covered and application requirements to obtain each permit are provided.

All permits noted in Table 8.7-10 may be obtained from any Cal-OSHA district or field office as needed. Notification requirements are listed as 24 hours because the permits may be required at several points in the construction of the plant or during operations; no specific permitting schedule is provided.

TABLE 8.7-10
Health and Safety Permits

Permit or Approval	Schedule	Applicability	Contact
Trenching and excavation permit	Submit completed permit application to any Cal-OSHA district or field office prior to commencing construction	Trenches and excavations of more than 5 feet that personnel are required to enter, **or** construction of buildings, structures, scaffolding, or falsework more than 3 stories high, **or** demolition of any building or structure, or dismantling of scaffolding, or falsework more than 3 stories high	Any Cal-OSHA district or field office
Permit to erect a fixed tower crane	Submit completed permit application to any Cal-OSHA district or field office at least 24 hours prior to initiation of activity	Required to erect, climb, or dismantle fixed tower cranes. Completion of erection of tower crane and commencement of operation, **or** climbing of the tower crane, **or** dismantling of the tower crane	Any Cal-OSHA district or field office

SUBSECTION 8.8

Socioeconomics

8.8 Socioeconomics

8.8.1 Introduction

This subsection discusses the environmental setting, consequences, regional and local impacts, and mitigation measures associated with the socioeconomic aspects of the San Francisco Electric Reliability Project (SFERP). Subsection 8.8.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to socioeconomics. Subsection 8.8.3 describes the environment that may be affected by SFERP construction and operation. Subsection 8.8.4 identifies environmental impacts from development of the power plant, and Subsection 8.8.5 discusses cumulative impacts. Environmental justice issues are addressed in Section 4, Environmental Justice, and an Environmental Justice analysis is provided in Appendix 8.8A. Mitigation measures are discussed in Subsection 8.8.7. Subsection 8.8.8 presents the agencies involved and provides agency contacts. Subsection 8.8.9 presents the required permits and permitting schedule. Subsection 8.8.10 provides references used to prepare this subsection.

The SFERP project is located at the corner of Illinois Street and 23rd Street in the Potrero District of the City and County of San Francisco (CCSF). For this project, the region of influence is the City and County of San Francisco.

Land use in the vicinity of the proposed SFERP project site is predominantly industrial to the north, south, and west, with some commercial and residential uses. The San Francisco Bay is located immediately east of the proposed site.

8.8.2 Laws, Ordinances, Regulations, and Standards

A summary of the LORS, including the project's conformance to them, is presented in Table 8.8-1.

8.8.2.1 Federal

Federal LORS are addressed in Section 4, Environmental Justice.

8.8.2.2 State

Government Code Sections 65996 and 65997 provide the exclusive methods of considering and mitigating impacts on school facilities that might occur as a result of the development of real property.

Education Code Section 17620, listed in Government Code Section 65997 as an approved mitigation method, allows school districts to levy a fee or other requirement against any construction within the boundaries of the school district for the purpose of funding construction of school facilities.

TABLE 8.8-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Socioeconomics*

LORS	Purpose	Applicability	Conformance
State			
Government Code Sections 65996-65997	Establishes that the levy of a fee for construction of an industrial facility be considered mitigating impacts on school facilities.	SFPUC is exempt because it is a public agency.	Subsections 8.8.4.3.6 and 8.8.4.4.6
Education Code Section 17620	Allows a school district to levy a fee against any construction within the boundaries of the district for the purpose of funding construction of school facilities.	SFPUC is exempt because it is a public agency.	Subsections 8.8.4.3.6 and 8.8.4.4.6
Local			
San Francisco General Plan, Commerce and Industry Element	The objectives of this element are to seek continued economic vitality, social equity and environmental quality	Encourages industry to minimize adverse impacts, expand employment, maintain a favorable social climate	Subsections 8.8.2.3, 8.8.3.3, 8.8.3.4, 8.8.4.3, 8.8.4.4

* See also Section 4 for a description of federal and other local LORS.

8.8.2.3 Local

8.8.2.3.1 San Francisco City and County

San Francisco General Plan: Commerce and Industry Element. The Commerce and Industry Element of the General Plan describes objectives and policies to enhance economic vitality, promote social equity, and maintain or enhance environmental quality. Three of the four objectives are relevant to Socioeconomics. Objective 1 is to manage economic growth so as to enhance the city's living and working environment. Objective 2 is to maintain and enhance the City's economic base and fiscal structure. Objective 3 is to provide expanded employment opportunities.

The project complies with Objective 1, Policies 1.1 and 1.2, since the development of this power plant will provide net benefits (e.g., reliable power, closure of Hunter's Point) and minimize undesirable consequences. Compliance with Objectives 2 and 3 are addressed in Subsections 8.3 and 8.4

Ordinance No. 124-01, Resolution 827-02 and Resolution 458-03. These LORS are discussed in Section 4, Environmental Justice.

8.8.3 Affected Environment

8.8.3.1 Population

San Francisco is bordered to the north by Marin County, to the south by San Mateo County, and to the east by the San Francisco Bay (Bay). In addition to San Mateo and Marin counties, San Francisco is in close proximity to the following six counties: Alameda, Contra Costa, Napa, Santa Clara, Solano, and Sonoma. The preceding nine counties are economically linked and are thus generally referred to as the nine-county Bay Area.

As shown in Table 8.8-2, with a January 1, 2003 estimated population of 791,600, and a projected population of 765,900 by the year 2015 (DOF, 2003a), San Francisco is expected to experience a reduction in population. As shown in Table 8.8-3, the average annual compounded growth rate for the period of 2000-2005 is estimated at 0.4 percent, compared to a growth rate for the State of 1.7 percent. This means that population growth in San Francisco will be almost stagnant during that 5-year period.

As shown in Table 8.8-3, the annual average population growth rate has been decreasing since 1990. According to the projections, sometime in the next 2 years (between 2004 and 2005), there will be a greater population outflow than inflow. In other words, more residents will move out of San Francisco than move in. This out-migration is expected to continue until at least 2020. The California Department of Finance projects that in July 2020, San Francisco will have a population of 755,800—a population level it had in 1998 (DOF, 2003a).

TABLE 8.8-2
Historical and Projected Populations*

Area	1990	1995	2000	2005(p)	2010(p)	2015(p)
San Francisco	723,959	751,899	776,733	793,500	787,500	765,900
California	29,758,213	31,910,061	34,480,300	37,473,500	40,262,400	42,711,200

Source: DOF, 2003a.
* Projected populations rounded to nearest 100.
(p) = projected

TABLE 8.8-3
Historical and Projected Annual Average Compounded Population Growth Rates

Area	1990-1995	1995-2000	2000-2005	2005-2010	2010-2015	2000-2015
San Francisco	0.8%	0.7%	0.4%	-0.2%	-0.6%	-0.1%
California	1.4%	1.6%	1.7%	1.4%	1.2%	1.4%

8.8.3.2 Housing

As shown in Table 8.8-4, housing stock for San Francisco as of January 1, 2003, was 354,017 units. Single-family homes accounted for 112,307 units, multiple-family dwellings accounted for 241,150 units, and mobile homes accounted for 560 units (DOF, 2003b). New housing authorizations for San Francisco in 2002 totaled 1,330 units; about 93 percent were multi-family and 7 percent were single-family units. These authorizations were valued at $487.7 million (DOF, 2003c). In December 2001, the median home price in San Francisco was $505,000 (DOF, 2003d). Housing availability, as measured by vacancy rate, has declined between 1990 (about 7 percent) and 2003 (about 4.3 percent). Housing demand has typically exceeded supply in San Francisco and continues to do so despite the economic downturn heralded by the "dotcom" bubble burst of 2000 and the historically low interest rates (SFCED, 2003).

TABLE 8.8-4
Housing Estimates by County and State, January 1, 2003

Area	Total Units	Single-Family	Multi-Family	Mobile Homes	Percent Vacant
San Francisco	354,017	112,307	241,150	560	4.3
California	12,600,651	8,096,880	3,928,963	574,808	5.8

Source: DOF 2003b.

8.8.3.3 Economy and Employment

San Francisco is in the San Francisco Primary Metropolitan Statistical Area (PMSA), which is comprised of the counties of San Francisco, San Mateo and Marin. Between 1999 and 2002, employment in the San Francisco PMSA decreased by 51,700 jobs or about 5 percent. This 5 percent decrease was not quite as severe as California's net decrease (8 percent) during that same period (CEDD, 2003a). As shown in Table 8.8-5, the Construction, Information and Government sectors were the only sectors that experienced an increase in employment. Although employment in Construction increased between 1999 and 2002, the contribution of this sector to the San Francisco PMSA economy remained relatively small.

TABLE 8.8-5
Employment Distribution in San Francisco PMSA, 1999 to 2002

	1999		2002		1999-2002	
Industry	Number of Employees	Employment Share (%)	Number of Employees	Employment Share (%)	Percentage Change (%)	Average Annual Compound Growth Rate (%)
Agriculture	3,600	0	3,400	0	-6	-1.9
Construction	42,900	4	45,500	5	6	2.0
Natural Resources, Mining	300	0	-	-	-100	-100.0
Manufacturing	63,100	6	50,100	5	-21	-7.4
Wholesale Trade	33,000	3	29,400	3	-11	-3.8
Retail Trade	97,600	9	97,000	10	-1	-0.2
Transportation, Warehousing and Utilities	57,100	5	48,700	5	-15	-5.2
Information	48,500	5	49,500	5	2	0.7
Financial Activities	97,000	9	96,900	10	0	0.0
Services	475,100	46	438,800	44	-8	-2.6
Government	125,500	12	132,700	13	6	1.9
Total Employment	1,043,700	100	992,000	100	-5	-1.7

Source: CEDD, 2003a.

Table 8.8-6 provides details about the characteristics of the San Francisco PMSA labor force. It shows 2002 employment data for the San Francisco PMSA and the nine-county Bay Area compared to California. Both the San Francisco PMSA and the nine-county Bay Area have unemployment rates that are lower than the State average. The California Employment Development Department (CEDD) does not project future unemployment rates.

TABLE 8.8-6
Employment Data, 2002

Area	Labor Force	Employment	Unemployment	Unemployment Rate (%)
San Francisco PMSA	939,600	884,100	55,500	5.9
Nine-county Bay Area	3,736,400	3,494,500	241,900	6.5
California	17,404,600	16,241,800	1,162,800	6.7

Source: CEDD, 2003a.

8.8.3.4 Fiscal Resources

The only relevant local agency with taxing power is CCSF. San Francisco's expenditures and revenues are presented in Table 8.8-7. Its revenues have been fluctuating for the past few years. From FY 2001 to FY 2002, San Francisco's revenues grew 5 percent. In FY 2003, the revenues were expected to decline by about 4 percent. The decline in revenue is attributable to the overall sluggish economy and the state deficit (which is responsible for the 5.3 percent decrease in intergovernmental transfers between FY 2002 and 2003).

TABLE 8.8-7
City and County of San Francisco Revenues and Expenditures ($ Million)

	FY 2001	FY 2002	Proposed FY 2003
Expenditures			
Salaries and Wages	$1,818	$1,954	$1,972
Fringe Benefits	$440	$464	$415
Overhead	$38	$43	$56
Professional & Contractual Services	$1,185	$1,172	$1,162
Aid Assistance	$297	$362	$371
Materials and Supplies	$183	$172	$186
Equipment	$46	$49	$50
Debt Service	$463	$584	$527
Services to Other Departments	$396	$408	$449
Expenditure Recovery	($481)	($533)	($602)
Budgetary Reserves	$91	$58	$42
Facilities Maintenance	$13	$11	$12
Capital Projects	$285	$257	$153

TABLE 8.8-7
City and County of San Francisco Revenues and Expenditures ($ Million)

	FY 2001	FY 2002	Proposed FY 2003
Total Expenditures	$4,773	$5,001	$4,790
Revenues			
Taxes	$1,367	$1,453	$1,439
Taxes - Property Taxes	$690	$702	$715
Taxes – Business	$675	$748	$721
Taxes – Other Local	$2	$3	$3
Licenses, Fines and Penalties	$108	$102	$150
Use of Money or Property	$327	$334	$326
Intergovernmental	$1,013	$1,064	$1,008
Charges for Services	$1,413	$1,543	$1,585
Other Revenues	$174	$173	$84
Fund Balance	$372	$333	$198
Total Revenue	$4,773	$5,001	$4,790

Source: City and County of San Francisco, 2003b.
Numbers may not add up due to independent rounding.

8.8.3.5 Education

The SFERP site is within the boundaries of the San Francisco Unified School District, which has a total of 114 elementary, middle and high schools. The closest schools to the project site include Enola Maxwell Middle School (655 DeHaro Street), and the Starr King (1215 Carolina Street) and Daniel Webster (465 Missouri Street) elementary schools. Current, as well as projected, enrollment figures for the combined San Francisco Unified School District (which includes the above three schools) are presented in Table 8.8-8. As shown in the table, the current enrollment levels for the School District have declined slightly (about 0.76 percent, or 441 students) over the prior year.

TABLE 8.8-8
Current and Projected Enrollment by Grade

	San Francisco Unified School District			Enola Maxwell MS[a], Starr King ES, & Daniel Webster ES combined		
Grade Level	Enrollment in 2002-03	Current Enrollment (2003-04)	Projected Enrollment[b] (2004-05)	Enrollment in 2002-03	Current Enrollment (2003-04)	Projected Enrollment[b] (2004-05)
Kindergarten	4,235	4,044		91	71	
First	4,310	4,284		84	85	
Second	4,326	4,234		103	81	
Third	4,504	4,272		116	99	

TABLE 8.8-8
Current and Projected Enrollment by Grade

	San Francisco Unified School District			Enola Maxwell MS[a], Starr King ES, & Daniel Webster ES combined		
Grade Level	Enrollment in 2002-03	Current Enrollment (2003-04)	Projected Enrollment[b] (2004-05)	Enrollment in 2002-03	Current Enrollment (2003-04)	Projected Enrollment[b] (2004-05)
Fourth	4,383	4,428		99	103	
Fifth	4,515	4,363		109	85	
Sixth	4,298	4,412		75	70	
Seventh	4,406	4,274		95	81	
Eighth	4,385	4,364		68	78	
Ninth	5,353	5,173				
Tenth	4,954	5,256				
Eleventh	4,396	4,606				
Twelfth	4,151	4,065				
Other (Ungraded Secondary)						
TOTAL	58,216	57,775		840	753	

Source: ED-Data, 2004; Fillingim-Selk, 2004.
ES, MS = Elementary School, Middle School.
[a] Enola Maxwell MS was formerly known as Potrero Hill MS.
[b] Projected enrollment numbers are currently not available.

8.8.3.6 Public Services and Facilities

8.8.3.6.1 Law Enforcement. The proposed SFERP project site is under the jurisdiction of the San Francisco Police Department (SFPD). The SFPD station closest to the proposed project site is the Bayview Station located at 201 Williams Avenue, San Francisco. The Bayview station has approximately 100 sworn officers: one captain, 4 lieutenants, 16 sergeants and approximately 80 patrol officers. There are 5 patrol cars that patrol the 5 sectors served by the Bayview Station. The station provides night and daytime patrols with 1 or 2 officers per patrol car.

All calls to the station are routed through the SFPD Emergency Communication Dispatch Center. The SFPD uses a prioritization system whereby calls are categorized as either A, B or C. The response time to an emergency call depends on the priority of the call. Calls categorized as 'A' (e.g., crimes in progress such as burglary, assault, shooting, stabbing, etc.) are typically responded to within 2 minutes. Response times to 'B' calls are longer than 2 minutes; whereas, 'C' calls are responded when convenient. 'B'-type calls are those involving crimes that have already happened; e.g., a burglary has already occurred and an officer is required to take a report. 'C'-type calls are those typically dealing with minor infractions (Puccinelli, 2004).

The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. Services include law enforcement, traffic control, accident investigation, and the management of hazardous materials spill incidents.

8.8.3.6.2 Fire Protection. The SFERP site is within the San Francisco Fire Department (SFFD) jurisdiction. SFFD Station No. 25 located at 3305 Third Street is the closest station to the SFERP site. The second and third closest stations to the SFERP site are No. 37 located at 798 Wisconsin and No. 9 located at 2245 Girard.

The SFFD staffs each of these stations with one officer and three firefighters at all times, and equips each station with one engine. Thus, Station Nos. 25 and 37 each have one engine staffed by an officer and three firefighters while Station No. 9 is comprised of an Engine Company (one engine and three firefighters), a Truck Company (one truck, one officer and 4 firefighters) and an Ambulance. The average response time to a call is approximately 3 to 4 minutes for all stations in the department (Juarez, 2004).

In the event of a fire at the site, SFFD would determine whether additional units were necessary, and call in other stations, as needed.

8.8.3.6.3 Emergency Response. SFFD has a Hazardous Materials (Haz Mat) Response Team made up of members of Engine Company 36 (Station No. 36 located at 109 Oak Street) and is backed up by the members of Rescue Squads 1 and 2. The chief officers of Battalion 2 are responsible for coordinating all Emergency operations. Further support is given to the unit by inspectors from the hazardous materials permit section of the Bureau of Fire Prevention, industrial hygienists, environmental health inspectors from the Department of Public Health, and the Coast Guard. The normal "emergency response" for the hazardous materials team is Battalion 2, Haz Mat 1, and a staff member from the Health Department. Sixty-one members of the San Francisco Fire Department are certified Hazardous Materials Specialists. Twenty-five of these members work at Station 36 (SFFD, 2004).

The Haz Mat team response time to an emergency at the proposed project site is approximately 30 minutes. They are capable of handling any emergency involving spills, e.g., aqueous ammonia.

8.8.3.6.4 Hospitals. The Potrero Hill Health Center, a clinic that is part of the Community Health Network of San Francisco (CHN), is located at 1050 Wisconsin in the Potrero Hill neighborhood, slightly over one mile from the project site. San Francisco General Hospital, the closest full-service hospital, is located approximately 1.5 miles from the project site. Concentra Medical Center (formerly Mission Bay Occupational Care Center), a workers' compensation clinic that provides services to employers, is located approximately 1 mile from the proposed project site at 728 20th Street. In addition, there are several emergency and urgent care facilities within a short distance of the project site.

8.8.3.7 Utilities

8.8.3.7.1 Electricity and Gas. The project will connect to the electrical transmission system via two 3-phase aboveground transmission lines to the adjacent Pacific Gas and Electric Company (PG&E) Potrero Substation. The total transmission distance will be less than 300 feet (see Section 5, Electric Transmission).

Natural gas for the facility will be provided by PG&E. A tap will be placed at the San Francisco Gas Load Center at the corner of Illinois and 23rd streets about 250 feet from the SFERP site. The gas services extension is assumed to be 12 inches in diameter. Gas supply is described in Section 6.0, Natural Gas Supply.

8.8.3.7.2 Water. Potable water for drinking, safety showers, fire protection water, service water, and sanitary uses will be provided via a city main located at Illinois and 23rd streets. Water for process and cooling water, equipment wash water and the dual plumbing system (toilets) would be recycled water produced on the site. The City will provide untreated process water from a process water pumping station to be constructed on Marin Street near Cesar Chavez, about one mile from the site. A new pipeline will be installed along Marin, Mississippi, Cesar Chavez, Tennessee, and 23rd streets to convey the process water to a new water treatment system located on the southern portion of the project site, adjacent to 23rd Street (see Figure 2-1). The water supply system is described in Subsection 8.14, Water Resources.

8.8.3.7.3 Wastewater Discharge. Plant wastewater and sanitary sewage will be discharged to the City's combined sewer system.

8.8.4 Environmental Consequences

This subsection assesses the potential environmental impacts of the project and linears.

8.8.4.1 Potential Environmental Impacts

Local environmental impacts were determined by comparing project demands during construction and operation with the socioeconomic resources of the project area (i.e., San Francisco). A proposed power-generating facility could impact employment, population, housing, public services and utilities, and/or schools. Impacts could be local and/or regional, although most socioeconomic impacts would tend to be more regional than local. As discussed further in this section, generally, it is anticipated that the project will not have any significant adverse impacts on the socioeconomic environment, and it will have some socioeconomic benefits to the local community. However, as is stated in Ordinance No. 124-01, Southeast San Francisco has been recognized as a minority community entitled to environmental justice and all in-City electric power generation is currently located in Southeast San Francisco. The potential impacts and benefits to Southeast San Francisco from the SFERP are described in Section 4, Environmental Justice and Section 3, Purpose and Need.

8.8.4.2 Significance Criteria

Section 15131 of the CEQA Guidelines suggests the following criteria are to be used to determine the significance of project-related socioeconomic impacts.

- Economic or social effects of a project shall not be treated as significant effects on the environment.
- Economic or social factors of a project may be used to determine the significance of physical changes caused by the project.

- Economic, social, and particularly housing, factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce or avoid the significant effects on the environment.

8.8.4.3 Construction Impacts

The project will include construction and may include demolition of existing buildings. Accordingly, the impacts of both construction and demolition are discussed in this application. Construction will take place over an approximate 10-month period, which is expected to occur from second quarter 2005 to first quarter 2006. There may also be a 3-month demolition period prior to the construction period.

8.8.4.3.1 Demolition and Construction Workforces. The primary trades in demand will include boilermakers, carpenters, electricians, ironworkers, laborers, millwrights, operators, and pipefitters. Tables 8.8-9 and 8.8-10 estimate demolition and construction personnel requirements for the plant and linear facilities. Total personnel requirements during demolition, if applicable, will be approximately 70 person-months, or 5.8 person-years. Total personnel requirements during construction of the plant will be approximately 1,872 person-months, or 156 person-years. Construction personnel requirements for the plant and water line will peak at approximately 258 workers in months 6 and 7 of the construction period.

TABLE 8.8-9
Demolition Personnel by Month

	Months After Notice to Proceed			
Discipline	**1**	**2**	**3**	**Total**
Laborers	4	8	8	20
Operating Engineers	3	6	6	15
Teamsters	5	10	10	25
Total Manual Staff	12	24	24	60
Total Contractor Staff	2	4	4	10
Total Plant Staff	14	28	28	70

TABLE 8.8-10
Construction Personnel by Month

	Months After Demolition Complete										
Discipline	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Power Plant											
Boilermakers		10	30	38	38	38	38	30	6	3	231
Bricklayers/Masons		2	3	3	3	3	3	2	2		21
Carpenters	4	7	7	7	7	7	7	7	4	3	60

TABLE 8.8-10
Construction Personnel by Month

Discipline	Months After Demolition Complete										Total
	1	2	3	4	5	6	7	8	9	10	
Electricians	16	25	35	35	38	38	38	38	30	11	304
Insulation Workers		2	9	12	12	12	12	12	12	5	88
Ironworkers	8	12	16	16	16	16	16	12	8	4	124
Laborers	20	12	12	14	14	16	16	16	12	8	140
Millwrights	8	10	12	22	24	24	24	24	14	4	166
Operating Engineers	9	8	9	9	9	9	9	8	6	3	78
Painters				2	2	3	3	6	6	2	25
Pipefitters	8	24	35	40	40	40	40	32	28	5	292
Sheetmetal Workers			3	3	3	4	4	4	1		22
Surveyors	4	2	2	2							10
Teamsters	8	4	4	4	4	4	4	4	2	1	39
Total Trade Staff	85	118	177	207	210	214	214	195	131	49	1,600
Total Contractor Staff*	15	20	30	35	36	36	36	33	22	9	272
Power Plant Labor Force	**100**	**138**	**207**	**242**	**246**	**250**	**250**	**228**	**153**	**58**	**1,872**
Process Water Line											
Equipment Operators				3	3	3	3				12
Pipefitters				2	2	2	2				8
Laborers				2	2	2	2				8
Foremen				1	1	1	1				4
Water Line Labor Force				8	8	8	8				32
TOTAL LABOR FORCE	**100**	**138**	**207**	**250**	**254**	**258**	**258**	**228**	**153**	**58**	**1,904**

* These are supervisors and laborers that work for the general contractor

The availability of skilled labor in San Francisco was evaluated by surveying a number of labor unions (Table 8.8-11) and by contacting CEDD (Tables 8.8-12 and 8.8-13). Both sources show that the workforce in San Francisco as well as that in the San Francisco PMSA and the greater Bay Area will be adequate to fulfill SFERP's labor requirements for construction. In addition, as shown in Table 8.8-5, the construction workforce within the San Francisco PMSA has been growing at an average annual rate of two percent per year. Therefore, SFERP construction will not place an undue burden on the local workforce.

TABLE 8.8-11
Labor Union Contacts

Labor Union	Contact	Phone Number
San Francisco Building and Construction Trades Council (BTC)	Stan Warren, Secretary/Treasurer	415-467-3330
International Brotherhood of Electrical Workers (IBEW) Local 6	Matt Bamberger, Business Representative	415-861-5752
United Association (UA) – Plumbers & Fitters Local 38	Larry Lee, Business Agent	415-626-2000

TABLE 8.8-12
Available Labor by Skill in San Francisco County, 2001 to 2008

Occupational Title	Annual Averages		Absolute Change	Percentage Change	Average Annual Compounded Growth Rate (%)
	2001	2008			
Carpenters	3,450	3,900	450	13.0	1.8
Cement Masons & Concrete Finishers	350	380	30	8.6	1.2
Painters, Construction & Maintenance	1,380	1,560	180	13.0	1.8
Sheet Metal Workers	400	500	100	25.0	3.2
Electricians	2,130	2,490	360	16.9	2.3
Welders, Cutters, Solderers, & Brazers	570	630	60	10.5	1.4
Industrial Truck & Tractor Operators	710	740	30	4.2	0.6
Operating Engineers	480	520	40	8.3	1.2
Helpers, Laborers	2,990	3,450	460	15.4	2.1
Plumbers, Pipefitters, & Steamfitters	770	840	70	9.1	1.3
Administrative Services Managers	7,870	7,710	-160	-2.0	-0.3
Mechanical Engineers	290	310	20	6.9	1.0
Electrical Engineers	390	400	10	2.6	0.4
Engineering Technicians	930	950	20	2.2	0.3
Plant & System Operators	650	690	40	6.2	0.9

Source: CEDD, 2003c.

TABLE 8.8-13
Available Labor by Skill in the San Francisco PMSA, 2001 to 2008

Occupational Title	Annual Averages		Absolute Change	Percentage Change	Average Annual Compounded Growth Rate (%)
	2001	2008			
Carpenters	8,570	9,020	450	5.3	0.7
Cement Masons & Concrete Finishers	1,170	1,130	-40	-3.4	-0.5
Painters, Construction & Maintenance	2,900	3,120	220	7.6	1.1
Sheet Metal Workers	1,230	1,390	160	13.0	1.8
Electricians	3,890	4,360	470	12.1	1.6
Welders, Cutters, Solderers, & Brazers	1,270	1,420	150	11.8	1.6
Industrial Truck & Tractor Operators	1,690	1,720	30	1.8	0.3
Operating Engineers	1,050	1,080	30	2.9	0.4
Helpers, Laborers	7,770	8,190	420	5.4	0.8
Plumbers, Pipefitters, & Steamfitters	2,040	2,090	50	2.5	0.3
Administrative Services Managers	13,100	13,050	-50	-0.4	-0.1
Mechanical Engineers	810	900	90	11.1	1.5
Electrical Engineers	1,220	1,300	80	6.6	0.9
Engineering Technicians	2,530	2,730	200	7.9	1.1
Plant and System Operators	1,000	1,080	80	8.0	1.1

Source: CEDD, 2003b.

8.8.4.3.2 Population Impacts. It is anticipated that most of the construction workforce will be drawn first from the San Francisco PMSA and then from the nine-county Bay Area. Construction workforce could also be drawn from other nearby counties, if necessary. Most workers are expected to commute to the project site, and therefore, will not contribute to an increase in the population of the area.

8.8.4.3.3 Housing Impacts. The construction workforce will most likely commute to the project site daily; however, if needed, there are about 244 hotels/motels with over 34,800 rooms in San Francisco to accommodate workers who may choose to commute to the project site on a workweek basis. In 2002, the average hotel/motel vacancy rate in San Francisco was about 33 percent, while the average room rate was $139 per night (Strong, 2003). In addition to the available hotel/motel accommodations, there are over 50 recreational vehicle (RV) parks within 20 miles of the proposed project site. As a result, construction of the proposed project is not expected to impact housing supply. Potential impacts of the SFERP on housing development in Southeast San Francisco are addressed in Subsection 8.4, Land Use.

8.8.4.3.4 Impacts to the Local Economy and Employment. The estimated value of materials and supplies that will be purchased locally during construction is $2 to $3 million. The City will provide about $13.18[1] million in demolition and construction payroll over the 17-month demolition and construction period, if demolition is part of the project. The anticipated payroll for employees, as well as the purchase of materials and supplies during the demolition and construction period, will have a slight beneficial impact on the area. Assuming, conservatively, that 60 percent of the demolition/construction workforce will reside in San Francisco, it is expected that approximately $5.58[2] million will stay in the local area during the 17-month demolition/construction period. These additional funds will cause a temporary beneficial impact by creating the potential for other employment opportunities for local workers in other service areas, such as transportation and retail.

Indirect and Induced Economic Impacts from Demolition and Construction. Demolition and construction activity would result in secondary economic impacts (indirect and induced impacts) within San Francisco. Indirect and induced employment effects include the purchase of goods and services by firms involved with construction, and demolition/construction workers spending their income within San Francisco. In addition to these secondary employment impacts, there are indirect and induced income effects arising from demolition and construction. Indirect and induced impacts were estimated using an IMPLAN Input-Output model of San Francisco. IMPLAN is an economic modeling software program. The estimated indirect and induced employment within San Francisco would be 13 and 32 jobs, respectively. These additional jobs result from the $3 million in annual local demolition/construction expenditures as well as the $3.91 million in spending by local demolition/construction workers. The $3.91 million represents the disposable portion of the annual demolition/construction payroll (assumed to be 70 percent of the $5.58 million in annual demolition/construction payroll spent locally). Assuming an average monthly direct demolition/construction employment of 165 person years [(1,904 person-months for construction/12 months) = 158.7 plus (70 person-months for demolition/12 months) = 5.8], the employment multiplier associated with the demolition/construction phase of the project is approximately 1.27 (i.e., [165 demolition/construction jobs + 13 indirect jobs + 32 induced jobs]/165). This project demolition/construction phase employment multiplier is based on a Type Social Accounting Matrix (SAM) model.

Assuming that annual local demolition/construction expenditures are $2 million instead of $3 million results in indirect and induced employment estimates within San Francisco of 8 and 31 jobs, respectively. Based on the same average demolition/construction employment of 162, the demolition/construction phase employment multiplier is approximately 1.24.

Indirect and induced income impacts were estimated at $520,708 and $1,405,662, respectively. Assuming a total annual local demolition/construction expenditure (payroll, materials, and supplies) of $8.58 million ($5.58 million in payroll + $3 million in materials and supplies), the project demolition/construction phase income multiplier based on a Type

[1] The initial $12.5 million in construction payroll was adjusted to reflect the addition of the demolition (70) and water line labor force (32).

[2] The $5.58 million represents the annual portion of the local payroll for construction and demolition (i.e., $13.18 million in construction payroll divided by 12/17 months then multiplied by 60 percent (or the portion assumed to be local).

SAM model is approximately 1.2 (i.e., [$8,580,000 demolition/construction expenditures + $520,708 indirect income + $1,405,662 induced income]/$8,580,000]).

Indirect and induced income impacts based on the total annual demolition/construction expenditure of $7.58 million ($5.58 million in payroll + $2 million in materials and supplies) were estimated at $347,138 and $1,376,789, respectively. Based on these estimates, the demolition/construction phase income multiplier was estimated at 1.2.

8.8.4.3.5 Fiscal Impacts. SFERP initial capital cost is estimated to be $140 million. The estimated value of materials and supplies that will be purchased locally (within San Francisco) during demolition/ construction is between $2 and $3 million. The effect on fiscal resources during demolition/ construction will be from sales taxes realized on equipment and materials purchased in San Francisco and from sales taxes from expenditures. The sales tax rate in San Francisco is 8.5 percent (BOE 2003). Of this, 6 percent goes to the state; 0.25 percent goes to the County; 1 percent goes to the place of sale; and 1.25 percent goes to the special districts (BOE, 2003). The total local sales tax generated during construction is expected to be $170,000 to $255,000 (i.e., 8.5 percent of local sales). Of this amount, 1.25 percent of the sales taxes (about $25,000 to $37,500) would go to San Francisco, since it would receive the sales taxes for both the County and the point of sale.

8.8.4.3.6 Impacts on Education. The schools in the San Francisco School District are currently not considered overcrowded. Student enrollment has been declining by an average of about 500 students a year since the 2001-02 school year (ED-Data, 2004; Fillingim-Selk, 2004). Enrollment figures for the current academic year (2003-04) indicate that this trend will continue.

Since there is a large local labor force, construction of SFERP will not cause significant population changes or housing impacts to the region. Most employees will commute to the site from within San Francisco (as well as from the nine-county Bay Area), as opposed to relocating to the area. As a result, SFERP construction will not cause any significant increase in demand for school services.

8.8.4.3.7 Impacts on Public Services and Facilities. The construction phases of the project may have minor impacts on police, fire, or hazardous materials handling resources. The San Francisco Fire Department does not anticipate any significant impacts during the construction phase of the project (Juarez, 2004). Copies of the records of conversation with the Police and Fire Departments are included in Appendix 8.8B. SFERP construction is not expected to create significant adverse impacts on medical resources in the area since there are a number of medical facilities in close proximity to the proposed project site. For more serious/major injuries, there are several emergency and urgent care facilities within a short distance of the project site.

8.8.4.3.8 Impacts on Utilities. SFERP demolition/construction will not make significant adverse demands on local water, sanitary sewer, electricity, or natural gas. While the project will require extension of existing utility lines, there is sufficient utility capacity for the project. Water requirements for demolition/construction are relatively insignificant. Given the modest number of workers and temporary duration of the demolition/construction period, the impacts on the local sanitary sewer system would not be significant.

8.8.4.4 Operational Impacts

8.8.4.4.1 Operational Workforce. The proposed SFERP facility is expected to begin commercial operation in late 2006. It is expected to employ up to 11 full-time staff. Anticipated job classifications are shown in Table 8.8-14. The entire permanent workforce is expected to commute from within San Francisco or from the nine-county Bay Area.

Facility employees will be drawn from the local workforce and from existing staff. Consequently, only a slight increase in population is anticipated as a result of this project. There will be no significant impacts on local employment.

TABLE 8.8-14
Typical Plant Operation Workforce

Department	Personnel	Shift	Workdays
Operations	5 Operating Technicians 1 Instrument and Controls Technician	Rotating 12-hour shift, 2 operators per shift, 2 relief operators	7 days a week
Maintenance	2 Maintenance Technicians	Standard 8-hour days	5 days a week (Maintenance technicians will also work unscheduled days and hours as required [weekends])
Administration	3 Administrators (1 Plant Manager, 1 Assistant Plant Manager, 1 Administrative Assistant)	Standard 8-hour days	5 days a week, with additional coverage as required

8.8.4.4.2 Population Impacts. It is expected that the operational workforce will be drawn either from the local population or from the nine-county Bay Area. Even if this were not the case, due to the modest number of operations staff, significant impacts on population are not anticipated.

8.8.4.4.3 Housing Impacts. Due to the few operations staff, significant impacts to housing are not anticipated. Based on the housing vacancy data in Table 8.8-4, there are approximately 15,222 available housing units within San Francisco. Thus, if there are employees who need to relocate, they could choose to live in San Francisco. Nonetheless, any new demand for housing created by the operational workforce would not be significant.

8.8.4.4.4 Impacts on the Local Economy and Employment. SFERP operation will generate a small, permanent beneficial impact by creating employment opportunities for local workers through local expenditures for materials, such as office supplies and services. The average salary (including benefits) per operations employee is expected to be between $73,000 per year and $91,000 per year (this is based on the estimated operational payroll of $0.8 to $1.0 million per year and 11 full-time employees). Approximately $200,000 to $300,000 will be spent locally (i.e., within San Francisco) on materials and services each year. These additional jobs and spending will generate other employment opportunities and spending

in the San Francisco area. The addition of 11 full-time jobs would not significantly reduce unemployment rates.

Indirect and Induced Economic Impacts from Operation. The operation of the proposed project would result in indirect and induced economic impacts that would occur within San Francisco, depending on the point of sale. These indirect and induced impacts represent permanent increases in San Francisco's economic variables. The indirect and induced impacts would result from annual expenditures on payroll as well as those on operations and maintenance (O&M).

Estimated indirect and induced employment within San Francisco would be 1 and 3 permanent jobs, respectively. These additional 4 jobs result from the $1.15 million ($0.9[3] million in payroll and $0.25[4] million in local purchase of materials and services) in annual operational budget expected to be spent locally within San Francisco. The operational phase employment multiplier is estimated at 1.4 (i.e., [11 + 1 + 3]/11) and is based on a Type SAM multiplier.

Indirect and induced income impacts are estimated at $68,218 and $1,070,476, respectively. The income multiplier associated with the operational phase of the project is approximately 2.0 (i.e., [$1,150,000 + $68,218 + $1,070,476]/$1,150,000) and is based on a Type SAM model.

8.8.4.4.5 Fiscal Impacts. During operation, approximately $200,000 to $300,000 will be spent locally (i.e., within San Francisco) on materials and services each year. As stated earlier, SFERP will bring between $0.8 million and $1.0 million in operational payroll to the region.

Since the City is a public agency, it does not pay property taxes. Thus, CCSF would not derive any additional funds from property taxes. However, it would receive sales tax revenue from the project.

During operations, additional sales tax revenues will be obtained by CCSF. Increased payroll will be $0.8 million to 1.0 million annually. Assuming local expenditures of $200,000 to $300,000 annually, the estimated sales taxes will be approximately $17,000 to $25,500. Of this amount, CCSF will receive $2,500 to $3,750 in sales tax revenues (1.25 percent of $200,000 to $300,000). The anticipated increase in sales tax revenues would be beneficial but not significant, since it would constitute such a small percent of total CCSF revenues.

8.8.4.4.6 Impacts on Education. The schools in the San Francisco Unified School District are currently not considered overcrowded. Even assuming that most of the 11 operational employees end up residing within San Francisco, SFERP operation is not expected to create any significant adverse impacts to the local school system (Fillingim-Selk, 2004). Assuming an average family size of 3.03 persons/household for San Francisco (U.S. 2000 Census) would imply the addition of between 11 and 22 children to the local schools. This would constitute less than one tenth of one percent increase in school enrollment. Due to its public agency status, the applicant is exempt from paying school impact fees to San Francisco Unified School District (Fillingim-Selk, 2004)

[3] The $0.9 million is the midpoint of the estimated annual operations payroll of $0.8 million and $1.0 million.

[4] The $0.25 million is the midpoint of the estimated annual expenditures on materials/services purchased locally during operation.

8.8.4.4.7 Impacts on Public Services and Facilities. Project operation will not make significant demands on public services or facilities even if all of the 11 operational employees decide to reside in San Francisco. The SFPD did not express any concerns about increased service demands during plant operations (Puccinelli, 2004). Copies of the records of conversation with the Police and Fire Departments are included in Appendix 8.8B. SFERP's operation would not create significant adverse impacts on medical resources in the area due to the safety record of power plants and few operations staff.

8.8.4.4.8 Impacts on Utilities. Potable water for drinking, safety showers, fire protection water, service water, and sanitary uses will be provided by the City. Water for process and cooling water, equipment wash water and the dual plumbing system (toilets) would be recycled water to be produced on the site at a new recycled water treatment system included as part of the project design. The plant's operation will not otherwise make significant adverse demands on local water, sanitary sewer, electricity, or natural gas because adequate supply and capacity currently exist.

8.8.5 Cumulative Impacts

Since both construction and operations personnel will be drawn primarily from San Francisco or the surrounding nine-county Bay Area, no adverse impact to local schools or housing is anticipated. No adverse cumulative socioeconomic impacts are anticipated from either the construction or operation of SFERP. Instead, San Francisco will receive a beneficial (but not significant) impact from short-term demolition/construction and longer-term operations.

As described in Land Use (Section 8.4), applications for 281 additional housing units have either been approved or are pending approval. A large mixed-use development is planned at Pier 70 by the Port of San Francisco, which is intended to promote industrial, research and development, and creative activities. No specific time tables for these projects are available. Therefore, cumulative construction impacts to schools, housing and public services cannot be analyzed with respect to the project. However, since the local construction workforce is so large, it is unlikely that development of these projects, even if they occurred simultaneously with the SFERP project, would create a significant cumulative impact.

8.8.6 Environmental Justice

Environmental justice is addressed in Section 4, Environmental Justice.

8.8.7 Mitigation Measures

Since there are no significant adverse impacts caused by the project, no socioeconomic-specific mitigation measures are proposed.

8.8.8 Involved Agencies and Agency Contacts

Table 8.8-15 provides a list of agencies and contact persons of potentially responsible agencies. Copies of records of conversation are provided in Appendix 8.8B.

TABLE 8.8-15
Agencies and Agency Contacts for SFERP Socioeconomics

Agency	Contact/Title	Phone Number	Address
San Francisco Unified School District	Jeff Fillingim-Selk, Head of Operations	415-241-6000	555 Franklin St., Rm 102 San Francisco, CA 94102
San Francisco Fire Department	Lt. Fernando Juarez	415-558-3200	698 Second Street San Francisco, CA 94107
San Francisco Police Department	Officer Qwan	415-671-2300	201 Williams Street San Francisco, CA

8.8.9 Permits and Permitting Schedule

Permits dealing with the effects on public services are addressed as part of the building permit process. For example, school development fees are typically collected when the applicant pays in-lieu building permit fees. However, since the applicant is a public agency, it does not pay school impact fees. No permits are required to comply with the socioeconomic impacts of the project.

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SUBSECTION 8.9

Agriculture and Soils

8.9 Agriculture and Soils

8.9.1 Introduction

This subsection describes the potential environmental effects on agriculture and soils from the construction and operation of the project. Potential impacts are assessed for the proposed San Francisco Electric Reliability Project (SFERP) site and the adjacent natural gas supply and electric transmission line connections, as well as the process water supply pipeline corridor.

Subsection 8.9.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to agriculture and soils. Subsection 8.9.3 describes the existing environment that could be affected, including agricultural use and soil types. Subsection 8.9.4 identifies potential environmental effects, if any, from project development, and Subsection 8.9.5 presents mitigation measures. Subsection 8.9.6 describes the required permits and provides agency contacts. Subsection 8.9.7 provides the references used to develop this subsection.

A map of soil types is provided in Figure 8.9-1 (figures are located at the end of this subsection). LORS are summarized in Table 8.9-1. The characteristics of the relevant soil types are summarized in Table 8.9-2. Soil loss is discussed in Subsection 8.9.3.4. The effect of plant emissions on soils is presented in Subsection 8.9.4.4. Required permits are summarized in Table 8.9-3.

8.9.2 Applicable Laws, Ordinances, Regulations, and Standards

Federal, state, county, and local LORS applicable to agriculture and soils are discussed below and summarized in Table 8.9-1.

8.9.2.1 Federal LORS

8.9.2.1.1 Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977. The Federal Water Pollution Control Act of 1972, commonly referred to as the Clean Water Act (CWA) following an amendment in 1977, establishes requirements for discharges of stormwater or wastewater from any point source that would affect the beneficial uses of waters of the United States. The Clean Water Act effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with a National Pollution Discharge Elimination System (NPDES) permit. The State Water Resources Control Board (SWRCB) is the permitting authority in California and has adopted a statewide general permit for stormwater discharges associated with construction activity (General Construction Permit; SWRCB, 1999) that applies to projects resulting in one or more acres of soil disturbance. Although construction of the proposed project would result in disturbance of more than one acre of soil, this permit would not apply to the proposed SFERP because the construction site would be graded to direct stormwater runoff directly to the City's combined sewer system. No stormwater would flow directly to the Bay or to a municipal separate storm sewer system.

However, stormwater discharges from the construction site to the City's combined sewer system would be subject to the requirements of the City and must be in compliance with the nine minimum controls described in the Federal Combined Sewer Overflow Control Policy (CSO Policy) and specified in the City's NPDES permit for the combined sewer system. The minimum controls include development and implementation of a pollution prevention program

that would be applicable to the SFERP. At a minimum, the City requires that the project sponsor develop and implement an erosion and sediment control plan to reduce the impact of runoff from the construction site. The erosion and sediment control plan must be reviewed and approved by the City prior to implementation, and the City will conduct period inspections to ensure compliance with the approved erosion and sediment control plan (Lee, 2004).

The CWA's primary effect on agriculture and soils within the project area consist of control of soil erosion and sedimentation during construction, including the preparation and execution of erosion and sedimentation control plans and measures for any soil disturbance during construction.

8.9.2.1.2 U.S. Department of Agriculture Engineering Standards. The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), *National Engineering Handbook*, 1983, Sections 2 and 3, provide standards for soil conservation during planning, design, and construction activities. The project would need to conform to these standards during grading and construction to limit soil erosion.

8.9.2.2 State LORS

8.9.2.2.1 California Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Control Act of 1972 is the state equivalent of the federal CWA, and its effect on the SFERP would be similar. The California Water Code requires protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. The discharge of soil into surface waters resulting from land disturbance may require filing a report of waste discharge (see Water Code Section 13260a). The Regional Water Quality Control Board (RWQCB), which controls surface water discharges, may become involved indirectly if soil erosion threatens water quality.

TABLE 8.9-1
Laws, Ordinances, Regulations, and Standards for Agricultural and Soil Resources

Jurisdiction	LORS	Purpose	Regulating Agency	Applicability (AFC Subsection Explaining Conformance)
Federal	Federal Water Pollution Control Act of 1972: Clean Water Act of 1977 (including 1987 amendments)	Regulates stormwater discharge from construction and industrial activities	RWQCB San Francisco Bay Region, under State Water Resources Control Board. USEPA may retain jurisdiction at its discretion.	Subsections 8.9.2.1 and 8.9.4.2
	Natural Resources Conservation Service (1983), *National Engineering Handbook*, Sections 2 and 3	Standards for soil conservation	Natural Resources Conservation Commission	Subsections 8.9.2.1 and 8.9.5
State	Porter-Cologne Water Quality Control Act of 1972; Cal. Water Code 13260-13269: 23 CCR Chapter 9	Regulates stormwater discharge	California Energy Commission (CEC) and the San Francisco Region, under State Water Resources Control Board	Subsections 8.9.2.2 and 8.9.4.2

TABLE 8.9-1
Laws, Ordinances, Regulations, and Standards for Agricultural and Soil Resources

Jurisdiction	LORS	Purpose	Regulating Agency	Applicability (AFC Subsection Explaining Conformance)
Local	Public Health Code	Hazardous waste	City and County of San Francisco	Subsections 8.9.2.3 and 8.9.4.2
	San Francisco Health Code Article 22A	Requires site history, and if necessary, soil sampling and analysis to identify hazardous wastes	San Francisco Department of Public Health; Director of the Department of Public Health	Subsections 8.9.2.3 and 8.9.4.2
	Building Code	Excavation and Grading	City and County of San Francisco	Subsection 8.9.2.3

8.9.2.3 Local LORS

The San Francisco Public Health Code (Article 22A) governs development of properties located in the filled land adjacent to San Francisco Bay with respect to hazardous waste materials that could be encountered during construction. Formerly known as the Maher Ordinance, it provides the requirements for testing and reporting for proposed developments in its area of jurisdiction.

In addition, the San Francisco Building Code (SFBC) amends the Uniform Building Code (UBC) and California Building Code (CBC) including Chapter 70, which establishes excavation, grading, and erosion control standards. It requires about 2 weeks for the Department of Building Inspection to assign an inspector to specific projects for review and approval of grading, excavation, and erosion control plans (Tham, 2003).

8.9.3 Environmental Setting

The proposed 4.5-acre SFERP site is located in southeast San Francisco within an urban area along the western shore of the San Francisco Bay (the Bay). The site is bounded on the west by an industrial property along Illinois Street, on the north by Humbolt Street, on the east by the Potrero Power Plant, and on the south by 23rd Street. Surrounding land uses are composed of mixed light and heavy industrial and commercial properties. Businesses in the surrounding area include shipping and dry dock facilities, warehouses, manufacturing, and various small commercial businesses. Historically, the SFERP site has been used for barrel manufacture (Geomatrix Consultants, Inc., 2000) and surrounding properties have been (or are currently) used for barrel manufacture, fuel storage tank facilities, steel and iron fabrication, manufactured gas plant facilities, railroad facilities, and a sugar refinery (Geomatrix Consultants, Inc., 2000).

There are no agricultural land uses within the proposed SFERP site or vicinity. The gas and electrical connections will be made to existing facilities adjacent to the SFERP site and the proposed process water pipeline will follow existing roadways and rights-of-way.

Soil survey mapping units characterizing the types and distribution of soils within the project area, as shown on Figure 8.9-1, are taken from *Soil Survey of San Mateo County,*

Eastern Part, and San Francisco County, California (NRCS, 1991). The electronic shape files for these mapping units were downloaded from the NRCS website. Detailed soil descriptions were developed from the soil survey publication (NRCS, 1991).

Data for the affected environment are summarized and presented below:

- Soil types for the project site and along the project water supply pipeline are identified in Figure 8.9-1.
- Table 8.9-2 summarizes the characteristics of each of the individual soil mapping units identified on Figure 8.9-1 in the project vicinity, including the site boundaries and the project's linear facilities. The table summarizes depth, texture, drainage, permeability, erosion hazard rating, land capability classification, and fertility as an indicator of its revegetation potential.
- There are no soil series designated as "Prime Farmland" (or Farmland of Statewide Importance) among the soils listed in Table 8.9-2.

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
131	Urban Land—Slope Class (0 to 5 percent typical, but may range from 0 to 30 percent) This map unit features areas where more than 85 percent of the surface is covered by paving, buildings, and other structures, typically at slopes of 0 to 5 percent. This map unit is classified as soil capability class VIII. This soil capability class corresponds to the lowest ranking suitability for field crops because soil limitations essentially preclude its use for commercial crop production. The soils at the SFERP and surrounding areas are not used for crop production. Urban soils are typically regraded, native soils with some amounts of fill. Given that the native soils likely derived from the underlying surficial geologic formations, which are mapped as serpentinized, ultramafic rock (Wagner et al., 1991), there is a potential for some of these soils to contain natural forms of asbestos.
134	Urban Land—Orthents, Reclaimed Complex—Slope Class (0 to 2 percent) This map unit includes areas that were once part of San Francisco Bay and adjacent tidal flats. It is about 65 percent urban land and 30 percent Orthents, reclaimed. Orthents consist of soils that have been filled and vary greatly in texture, including soil, gravel, concrete and asphalt rubble, solid wastes, and Bay Mud. They are very deep and can be poorly to somewhat poorly drained. The highly variable soil characteristics are related to the differences and amount of fill material used. Some areas have a permanent high water table at a depth of 30 to 60 inches because of fluctuating tides. Runoff is slow and the hazard of water erosion is low. The map unit is in capability class VIII and, as mentioned above, this soil capability class has limitations that essentially preclude its use for commercial crop production. The main limitations of these soils are a high water table, potential for subsidence and low fertility. These soil mapping units have highly variable soil properties related to the type and quality of fill used.
132	Urban Land—Orthents, Cut and Fill Complex—Slope Class (0 to 5 percent)*
133	Urban Land—Orthents, Cut and Fill Complex—Slope Class (5 to 75 percent)*

Notes:
Soil characteristics are based on soil mapping provided in the published soil survey (NRCS, 1991) and are limited to those mapped in the vicinity of the SFERP project.

* These soil units comprise the majority of the area moving westward (inland) from the SFERP area and consist primarily of urban land and Orthents (i.e., young soils) complexes, as listed below. The soils are similar to the soil mapping unit 131 in that regraded soils often derive from the in-place, native soils, which are not mapped. Because these soils are outside of the proposed SFERP area and not associated with important farmlands or wetland areas, they are not described in detail.

8.9.3.1 Agricultural Use on and around the Proposed SFERP Site

The types of land use surrounding the proposed SFERP site are presented and discussed in Subsection 8.4, Land Use. A review of the aerial photograph base map, provided in the soil survey (NRCS, 1991), confirmed that the site and surrounding areas are not used to support livestock or agricultural production. The soils mapped at the SFERP and surrounding areas are indicated to be of the soil capability subclass VIII, essentially unsuitable to commercial crop production. None of the mapped soil units in the areas are associated with prime agricultural land.

The Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation (CDC) does not provide any statistics on conversion of farmland to non-agricultural uses for San Francisco County where the SFERP site is located (CDC, 2003). A review of the "Important Farmlands" mapping by the FMMP shows the project site and surrounding areas to be designated as "Urban and Built-Up Land."

8.9.3.2 Agricultural Use along the SFERP Linear Features

The proposed SFERP project will have gas and transmission line connections located adjacent to the proposed SFERP site. Similarly, potable water needs will be met with existing potable water supply lines adjacent to the site. The process water supply for the SFERP project will be pumped from a water pumping station (see Figure 8.9-1) through a conveyance pipeline that will bring the wastewater to the SFERP site where it will be treated for use in an onsite treatment plant. The process water pipeline will be constructed within the rights-of-way from the southern boundary of the SFERP site, west along 23rd Street, south along Tennessee Street, west along Cesar Chavez, and south along the Southern Pacific Railroad (SPRR) alignment to Marin Street. Therefore, the SFERP linear features will have no impact on agricultural land uses.

8.9.3.3 Soil Types within the Study Area and Prime Farmlands

Table 8.9-2 provides a description of the properties of the soil mapping units that are found in the vicinity of the proposed SFERP site and along the proposed process water route. As indicated, the soil mapping units in the project area are associated with urban land and Orthents (i.e., young soils) with wide-ranging slope classes and low capability to support commercial crop production (soil capability class VIII). The proposed SFERP project will not affect any Prime Farmlands or other important farmlands. In fact, the project will not affect any lands used for agricultural production.

8.9.3.4 Soil Loss and Erosion

The SFERP site is nearly level and is almost entirely covered with existing structures and paving. The mapped soils in the SFERP area are associated with urban land and Orthents, which have highly variable soil properties due to the different types of fill that may have been used. The soil survey provides very little specific information about these units that could be used to estimate soil loss using the Revised Universal Soil Loss Equation (RUSLE), which is typically used to quantify water-induced erosion in agricultural areas.

The map unit description for the Orthents indicated a low potential for water erosion. Given the developed nature and relatively low slopes of the site and surrounding areas, it is believed that the use of construction best management practices (BMPs) will reduce the

potential for soil loss and erosion to a negligible level. It is recognized that the revegetation potential of the site is low due to low soil fertility, so any areas not covered by structures or paving will require imported topsoil in order to establish adequate vegetation for long-term protection.

Because adequate steps will be taken as part of the design review process (specifically, the development of an erosion and sedimentation control plan [ESCP]), soil loss and erosion is not considered to be a significant problem for the proposed SFERP. For this reason, estimates of soil loss using the RUSLE were not conducted.

8.9.3.5 Other Significant Soil Characteristics

A significant soil characteristic concerning the proposed project is the potential for shallow groundwater that could affect excavations, especially in the reclaimed southern portions of the SFERP site. These areas, constructed over the former Bay, may also have subsidence issues for construction.

The underlying surficial geologic formation is mapped as a serpentinized, ultramafic rock (Wagner et al., 1991), so any native soils could have some naturally occurring asbestos materials, and would require dust control and possibly require personal protective equipment during drilling or certain earth moving construction activities. Given the industrial history of the site and surrounding properties, there is a significant possibility of encountering contaminated soil materials during drilling and excavation (see Subsection 8.13 for a detailed discussion).

8.9.4 Potential Environmental Consequences

The following subsections describe the potential environmental effects on agricultural production and soils during the construction and operation phases of the project.

The potential for impacts to agricultural and soils resources were evaluated with respect to the criteria described in the Appendix G checklist of CEQA. An impact is considered potentially significant if it would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps for the Farmland Mapping and Monitoring Program by the California Resources Agency, to non-agricultural use
- Conflict with existing zoning for agricultural use or a Williamson Act contract
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use
- Impact jurisdictional wetlands
- Result in substantial soil erosion

The following subsections describe the anticipated environmental impacts on agricultural production and soils during plant construction and operation.

8.9.4.1 Impacts on Agricultural Soils or Wetland Soils

As previously indicated, the SFERP site and associated linears are located within an urban portion in the Potrero District of southeastern San Francisco. There are no current agricultural uses of the lands at the SFERP site or in the surrounding areas. The mapped soils in these areas are considered essentially unsuitable for commercial crop production. As such, the proposed SFERP will not have any impact on agricultural soils or important farmlands. For this reason, the SFERP will not affect any properties currently under a Williamson Act contract or conflict with existing zoning for agricultural use.

Based on an assessment of the soil survey information and knowledge of the site conditions, the proposed SFERP will not affect wetland soils. The only soils mapped in the SFERP area that have somewhat poorly drained conditions (indicating potential hydric soils) are those associated with the soil mapping unit (134 Urban Land–Orthents, Reclaimed Complex). While this soil unit is mapped near the southern portion of the site, the current conditions indicate that the site is almost entirely paved or covered with existing structures. There are no wetlands on the site and the soil drainage would be expected to improve moving westward (inland) along the process water pipeline linear route along 23rd Street, Tennessee Street, Cesar Chavez, and the SPRR alignment.

8.9.4.2 Construction

Construction activities can potentially impact soil resources by increasing soil erosion and soil compaction. The effect of soil erosion would be that soil lost during or after construction could increase the sediment load in surface receiving waters downstream of the construction site. The magnitude, extent, and duration of this construction-related impact depends on the erodibility of the soil (discussed above), the proximity of the construction activity to a receiving water, and the construction methods, duration, and season.

The potential for erosion associated with the soil types at the SFERP and surrounding areas is minimal. Further, by requiring the use of construction BMPs during construction, the impacts from soil erosion are expected to be less than significant. Typical BMPs are outlined in Section 8.9.5.

Construction of the proposed project would result in soil compaction during the construction of foundations, pump stations, pipelines, and paved roadway and parking areas. Soil compaction would also result from vehicle traffic along temporary access roads and in equipment staging (laydown) areas. Soil compaction increases soil density by reducing soil pore space. This, in turn, reduces the ability of the soil to absorb precipitation and transmit gases for respiration of soil microfauna. Soil compaction can result in increased runoff, erosion, and sedimentation. The incorporation of BMPs during project construction will result in less-than-significant impacts from soil compaction during construction.

Since the site and project linears will be constructed in currently developed areas that will be repaved or otherwise protected after construction, the overall anticipated effects of construction are considered to be less than significant.

Because of the SFERP site's historical industrial usage since the early 1900s, various environmental site investigations (E&E, 1996; CDM, 1997; FD-GTI, 1998; and Geomatrix Consultants, Inc., 2000) were conducted for the site and surrounding properties. The purpose of these environmental site investigations was to evaluate possible areas of soil

and/or groundwater contamination. Construction of the project will potentially involve excavation of impacted soils, primarily by heavy metals and polynuclear aromatic hydrocarbons (PAHs), and residues from a former manufactured gas plant (MGP). Management of excavated materials at the site and along the process water pipeline will be conducted in accordance with the Site Mitigation and Implementation Plan (SMIP). The SMIP document is needed to satisfy the requirements of Article 22A of the San Francisco Public Health Code, which governs development within the filled lands adjacent to San Francisco Bay.

8.9.4.3 Operation

Operation of the SFERP plant would not result in impacts to the soil from erosion or compaction. Routine vehicle traffic during plant operation will be limited to existing roads, all of which are paved, and standard operational activities should not involve the disruption of soil. Therefore, impacts to soil from project operations would be less than significant.

8.9.4.4 Effects of Generating Facility Emissions on Soil-Vegetation Systems

There is a concern in some areas that emissions from a generating facility, principally nitrogen (NO_x) from the combustors or drift from the cooling towers, would have an adverse effect on soil-vegetation systems in the project vicinity. This is principally a concern where environments that are highly sensitive to nutrients or salts, such as serpentine habitats, are downwind of the project.

In this case, the dominant land use around the project is urban and the serpentine habitats in the project area are all developed for industrial, commercial, or residential uses. The addition of small amounts of nitrogen to the industrial and commercial areas would be insignificant because of the paucity of vegetation in these areas. Within the more vegetated residential areas, the addition of small amounts of nitrogen would be insignificant within the context of fertilizers, herbicides, and pesticides typically used by homeowners.

8.9.4.5 Cumulative Effects

As previously described, the effects on soil erosion, sedimentation, and compaction associated with the construction and operation of the SFERP are not considered to be significant. Therefore, the cumulative impacts of the proposed SFERP would be negligible. Impacts related to the excavation of contaminated soils would not be significant because all excavated materials will be handled in accordance with the SMIP, as discussed in Subsection 8.9.4.2.

8.9.5 Mitigation Measures

Erosion control measures would be required during construction to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation that destroys soil productivity and soil capacity.

8.9.5.1 Temporary Erosion Control Measures

Temporary erosion control measures would be implemented before construction begins, and would be evaluated and maintained during construction. These measures typically include revegetation, mulching, physical stabilization, dust suppression, berms, ditches, and

sediment barriers. These measures would be removed from the site after the completion of construction.

The process water pipeline is anticipated to be constructed within the right-of-way associated with 23rd Street, Tennessee Street, Cesar Chavez, and the SPRR alignment. Temporary erosion control might include asphalt patching until permanent paving can be completed. If required on non-paved areas disturbed by the pipeline construction, revegetation would be accomplished using locally prevalent, fast-growing plant species compatible with adjacent existing plant species.

During construction of the project and the related linear facilities, dust erosion control measures would be implemented to minimize the wind-blown erosion of soil from the site. Water of a quality equal to, or better than, either existing surface runoff or irrigation water would be sprayed on the soil in construction areas to control dust during revegetation.

Sediment barriers slow runoff and trap sediment. Sediment barriers include straw bales, sand bags, straw wattles, and silt levees. They are generally placed below disturbed areas, at the base of exposed slopes, and along streets and property lines below the disturbed area. Sediment barriers are often placed around sensitive areas; such as wetlands, creeks, or storm drains; to prevent contamination by sediment-laden water.

The site will be constructed on relatively level ground; therefore, it is not considered necessary to place barriers around the property boundary. However, some barriers would be placed in locations where offsite drainage could occur to prevent sediment from leaving the site. If used, sediment barriers would be properly installed (staked and keyed), then removed or used as mulch after construction. Runoff detention basins, drainage diversions, and other large-scale sediment traps are not considered necessary due to the level topography and surrounding paved areas. Any soil stockpiles, including sediment barriers around the base of the stockpiles, would be stabilized and covered if left onsite for long periods of time. These methods can also be employed during trenching operations for the recycled water supply line.

As previously mentioned, contaminated soils or bedrock material excavated during construction would be handled in accordance with the SMIP.

8.9.5.2 Permanent Erosion Control Measures

Permanent erosion control measures on the site will include graveling, paving, and drainage systems.

8.9.6 Permits and Agency Contacts

Permits required for the project, the responsible agencies, and proposed schedule are shown in Table 8.9-3. A construction permit, including a grading permit, will be obtained from the City before construction begins. Other required permits include an Industrial Wastewater Discharge Permit, as discussed in Subsection 8.14, Water Resources.

TABLE 8.9-3
Permits and Agency Contacts for SFERP Soils

Permit or Approval	Schedule	Agency Contact	Applicability
Approval of grading plan; issuance of construction and grading permits	Prior to construction	None identified CCSF Department of Public Works, Bureau of Building Inspection 1660 Mission Street, 6th floor San Francisco, CA 94103-2414 (415) 558-6087	Grading, excavation, and erosion control plan for site
Hazardous waste	Prior to construction	Mardeeta Jones CCSF Department of Public Health 101 Grove Street San Francisco, CA 94102 (415) 252-3938	Approval of Site Mitigation and Implementation Plan
Erosion and Sediment Control Plan	Prior to construction	Tommy Lee SFPUC Bureau of Environmental Regulation and Management (BERM) 3801 Third Street, Suite 600 San Francisco, CA 94124	Regulation of stormwater discharge from site and linear facilities during construction

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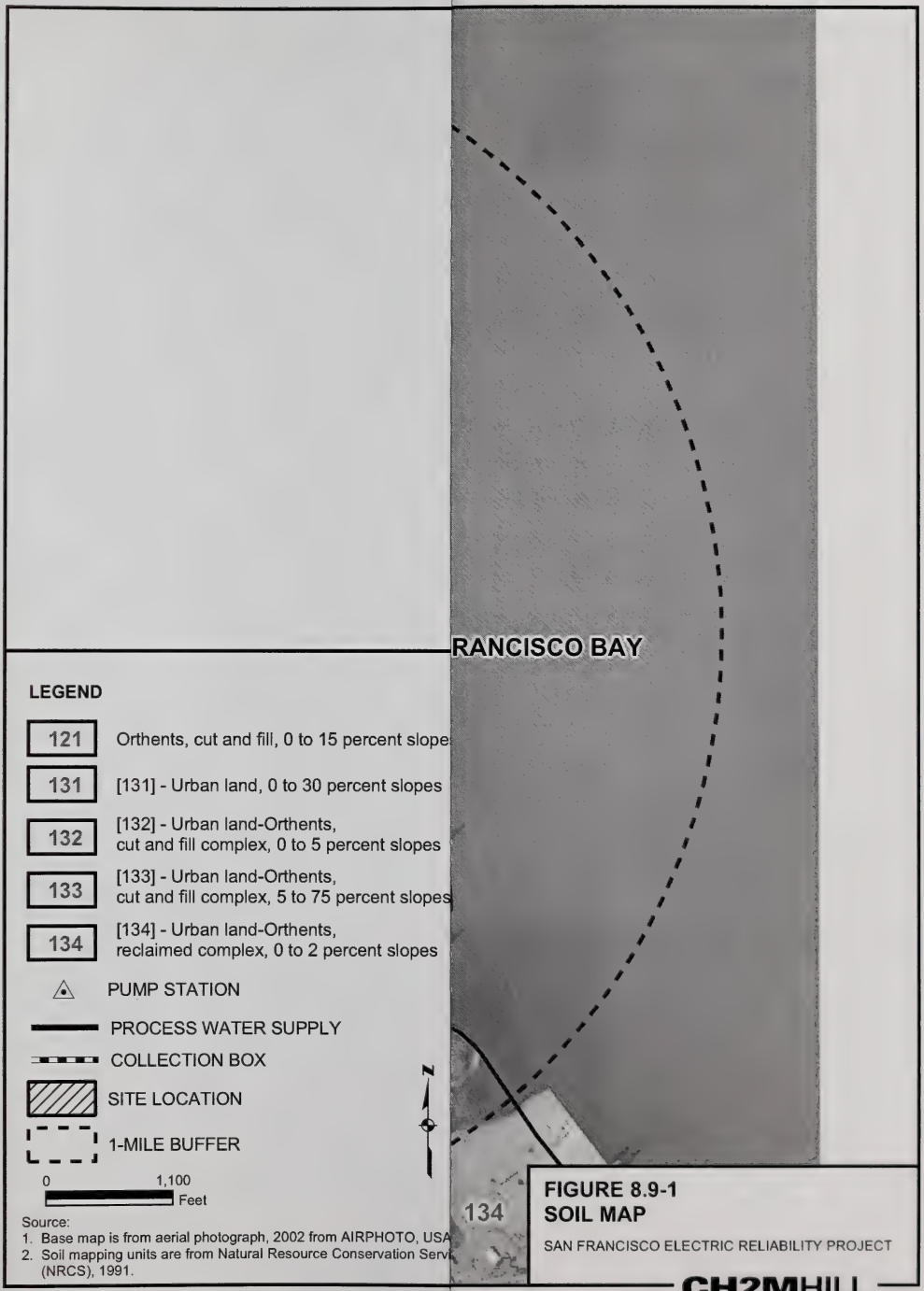


FIGURE 8.9-1
SOIL MAP

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

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FIGURE 8.9-1
SOIL MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

PCD \\LOK\PROJECTS\RDOGIS\SFPUC\MXDS\8_9-1_SOIL.MXD 8_9-1_SOIL.PDF 03/03/2004 08:25:18

SUBSECTION 8.10

Traffic and Transportation

8.10 Traffic and Transportation

This section assesses transportation impacts associated with the proposed project. The analysis primarily quantifies impacts on intersection levels of service expected during construction (the addition of approximately 524 maximum daily vehicles including construction workers and trucks) of the proposed project. Additional transportation factors examined in this section include pedestrian and bicyclist impacts, safety, goods movement, and any potential impacts to air, rail, and waterborne transportation networks.

Descriptions of existing transportation facilities in proximity of the proposed project and an analysis of the proposed project's potential impacts on the existing transportation network are provided. The intersection level of service (LOS) analysis examines the worst-case scenario during construction activities (which would occur for a 2-month duration) to the local study area intersections. The operation of the proposed project would include relatively few peak hour trips, which would be associated with permanent employees (20 employees, or 20 a.m. and 20 p.m. peak hour trips). Once these employee peak hour trips are distributed on the street network, traffic impacts would be immeasurable due to the relatively low volume of traffic generated. An additional 60 trips are anticipated to occur throughout the workday (i.e., materials deliveries, visitors, work-related business trips), but not during the critical peak commute hours.

Information sources include traffic counts, data provided by the City of San Francisco's Department of Parking and Transportation (DPT), the California Department of Transportation (Caltrans) and field observations. This subsection also discusses applicable laws, ordinances, and regulations (LORS) relevant to the potential transportation impacts caused by the proposed project.

8.10.1 Laws, Ordinances, Regulations and Standards

LORS related to traffic and transportation are summarized in the following subsections.

8.10.1.1 Federal

- Title 49, Code of Federal Regulations (CFR), Sections 171-177 (49 CFR 171-177), governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- 49 CFR 350-399, and Appendices A-G, Federal Motor Carrier Safety Regulations, address safety considerations for the transport of goods, materials, and substances over public highways.
- 49 CFR 397.9, the Hazardous Materials Transportation Act of 1974, directs the U.S. Department of Transportation to establish criteria and regulations for the safe transportation of hazardous materials.

8.10.1.2 State

State laws that apply to this project include the following sections of this California Vehicle Code (CVC), unless specified otherwise:

- California Street and Highways Code (S&HC), Sections 660, 670, 1450, 1460 et seq., 1470, and 1480, regulates right-of-way encroachment and granting of permits for encroachments on state and county roads.
- Sections 13369, 15275, and 15278 address the licensing of drivers and classifications of licenses required for operation of particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are addressed.
- Sections 25160 et seq. describe requirements for the safe transport of hazardous materials.
- Sections 2500-2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol (CHP) to transport hazardous materials, including explosives.
- Sections 31303-31309 regulate the highway transportation of hazardous materials, routes used, and restrictions. CVC Section 31303 requires hazardous materials to be transported on state or interstate highways that offer the shortest overall transit time possible.
- Sections 31600-31620 regulate the transportation of explosive materials.
- Sections 32000-32053 regulate the licensing of carriers of hazardous materials and include noticing requirements.
- Sections 32100-32109 establish special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. CVC Section 32105 requires shippers of inhalation or explosive materials to contact the CHP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook specifying approved routes.
- Sections 34000-34121 establish special requirements for transporting flammable and combustible liquids over public roads and highways.
- Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5, and 34510-11 regulate the safe operation of vehicles, including those used to transport hazardous materials.
- S&HC, Sections 117 and 660-72, and CVC, Sections 35780 et seq., require permits to transport oversized loads on county roads. California S&HC Sections 117 and 660 to 711 requires permits for any construction, maintenance, or repair involving encroachment on state highway rights-of-way. CVC Section 35780 requires approval for a permit to transport oversized or excessive loads over state highways.
- California State Planning Law, Government Code Section 65302, requires each city and county to adopt a General Plan, consisting of seven mandatory elements, to guide its physical development. Section 65302(b) requires that a circulation element be one of the mandatory elements.
- All construction in the public right-of-way will need to comply with the "Manual of Traffic Controls for Construction and Maintenance of Work Zones" (Caltrans 1996).

- California Department of Transportation (Caltrans) weight and load limitations for state highways apply to all state and local roadways. The weight and load limitations are specified in the CVC Sections 35550 to 35559. The following provisions, from the CVC, apply to all roadways and are therefore applicable to this project.

 General Provisions:

 - The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
 - The maximum wheel load is the lesser of the following: a) the load limit established by the tire manufacturer, or b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.

 Vehicles with Trailers or Semitrailers:

 - The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds.

8.10.1.3 Local

The transportation elements of local plans that are applicable to the project are summarized in Table 8.10-1 and in the following subsection.

- The San Francisco General Plan, transportation and circulation elements, sets forth policies that are applicable to the project. They are as follows:
 - The City's level of service standards for the state highway system and specific routes of regional significance shall be those standards adopted in the General Plan.
- Regional Transportation Plan (RTP) represents the blueprint for major transportation investments in the Bay Area region over the 25-year period from 2000 to 2025. The plan provides a vision for the regional transportation system, now and in the future, and is designed to achieve specific goals defined by the Association of Bay Area Governments (ABAG).

8.10.1.4 Compliance with Laws, Ordinances, Regulations, and Standards

All applicable LORS and administering agencies are summarized subsequently. Table 8.10-1 describes how the project will comply with all LORS pertaining to traffic and transportation impacts.

TABLE 8.10-1
Compliance with Laws, Ordinances, Regulations, and Standards

Authority	Administering Agency	Requirements	Compliance (Location in AFC where compliance discussed)
49 CFR, Section 171-177 and 350-300 Chapter II, Subchapter C and Chapter III, Subchapter B	U.S. Department of Transportation and Caltrans	Requires proper handling and storage of hazardous materials during transportation.	Project and transportation will comply with all standards for the transportation of hazardous materials.
CVC §31300 et seq.	Caltrans	Requires transporters to meet proper storage and handling standards for transporting hazardous materials on public roads.	Transporters will comply with standards for transportation of hazardous materials on state highways during construction and operations. The project will conform to CVC §31303 by requiring that shippers of hazardous materials use the shortest route possible to and from the site.
CVC §§31600 - 31620	Caltrans	Regulates the transportation of explosive materials.	The project will conform to CVC 31600 - 31620.
CVC §§32000 - 32053	Caltrans	Regulates the licensing of carriers of hazardous materials and includes noticing requirements.	The project will conform to CVC 32000 - 32053.
CVC §§32100 - 32109 and 32105.	Caltrans	Establishes special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. Requires that shippers of inhalation or explosive materials contact the CHP and apply for a Hazardous Material Transportation License.	The project will conform by requiring shippers of inhalation or explosive materials to contact the CHP and obtain a Hazardous Materials Transportation License.
CVC §§34000 –34121.	Caltrans	Establishes special requirements for the transportation of flammable and combustible liquids over public roads and highways.	The project will conform to CVC §§34000 - 34121.
CVC §§34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5 and 34510-11.	Caltrans	Regulates the safe operation of vehicles, including those used to transport hazardous materials.	The project will conform to these sections in the CVC.
CVC §§35550-35559	Caltrans	Regulates weight and load limitations.	The project will conform to these sections in the CVC.
CVC §§25160 et seq.	Caltrans	Addresses the safe transport of hazardous materials.	The project will conform to these sections in CVC.

TABLE 8.10-1
Compliance with Laws, Ordinances, Regulations, and Standards

Authority	Administering Agency	Requirements	Compliance (Location in AFC where compliance discussed)
CVC §§2500-2505.	Caltrans	Authorizes the issuance of licenses by the Commissioner of the CHP for the transportation of hazardous materials including explosives.	The project will conform to these sections in the CVC.
CVC §§13369, 15275, and 15278.	Caltrans	Addresses the licensing of drivers and classifications of licenses required for the operation of particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are required.	The project will conform to these sections in the CVC.
S&HC §§117, 660-711	Caltrans	Requires permits from Caltrans for any roadway encroachment during truck transportation and delivery.	Encroachment permits will be obtained by transporters, as required.
CVC §35780; S&HC §660-711; 21 CCR 1411.1-11411.6	Caltrans	Requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways.	Transportation permits will be obtained by transporters for all overloads, as required.
S&HC §§660, 670, 1450, 1460 *et seq.*, 1470, and 1480	Caltrans	Regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.	The project will conform to these sections in the CVC.
California State Planning Law, Government Code Section 65302	Caltrans	Project must conform to the General Plan.	Project will comply with General Plan.

CCR California Code of Regulations
CFR Code of Federal Regulations
CVC California Vehicle Code
S&HC California Streets and Highways Code

8.10.2 Affected Environment

8.10.2.1 Project Location and Description

The proposed project involves a power generation facility, and the construction of a water pump station (WPS) at an existing collection station southwest of the project site to a new onsite water treatment system. Figure 8.10-1 illustrates the regional location of the project site and its relative transportation and transit facilities. The proposed power generation facility is located within the existing Potrero Power Plant (Potrero PP) site in the southeastern portion of San Francisco, while the proposed process water supply pipeline and WPS would be generally installed along 23rd, Indiana, Cesar Chavez, Marin Streets (Figure 8.10-2). The project site is at 1201 Illinois Street, east of Third Street and bounded by Humboldt Street to the north and by 23rd Street to the south. A temporary construction "laydown" area (for staging, equipment, and construction worker parking) will be provided two blocks south of the project site, southeast of Maryland Street/25th Street with access from Maryland Street. Construction workers would be shuttled via busses from the lay down area to the project site. The shuttle route would travel within the industrial area along Illinois Street and would not impact through traffic on Third Street. Access to the project site for construction worker shuttles and materials delivery trucks would occur from 23rd Street, east of Illinois Street. The construction crew for the pipeline facilities (crew of eight workers) would be staged in appropriate areas adjacent to pipeline construction activities. The study area is bounded by the San Francisco Bay to the east, Evans Avenue/Hunters Point Boulevard to the south, Evans Avenue to the west, and 16th Street to the north.

The surrounding land uses are primarily warehouses and industrial activities. Port facilities, including dry docks for ship maintenance, lie farther east and south. The proposed facility would result in additional traffic that includes both passenger vehicles related to construction workers and permanent employees, and delivery vehicles transporting commercial equipment, as well as potential impacts related to street closures associated with pipeline installation.

8.10.2.2 Existing Transportation Facilities

8.10.2.2.1 Regional Roadway Facilities. The proposed project lies near primary transportation corridors that traverse the southern and eastern sections of San Francisco, providing access between Peninsula communities and the employment and cultural centers of the City of San Francisco (City). Major freeways in proximity to the proposed project site include Interstate 280 (I-280), U.S. Highway 101 (US 101), and Interstate 80 (I-80).

Interstate 280. Interstate 280 begins in the South of Market (SoMa) district of San Francisco, extends southwest through Daly City, then proceeds south adjacent to suburban Peninsula communities such as Redwood City and Palo Alto, before heading into downtown San Jose. After reaching San Jose, I-280 turns north as Interstate 680 (I-680), extending into East Bay communities such as Walnut Creek, and Concord. I-280 is comprised of 6- to 8-lanes of mixed flow traffic in the area near the proposed project. According to traffic counts conducted by Caltrans in 2002, I-280 carries approximately 92,000 average daily vehicle-trips. Access to the project site from I-280 southbound is by the 25th Street exit, while the Cesar Chavez Street exit provides access from I-280 northbound.

U.S. Highway 101. US 101 serves as one of California's primary western arteries, linking San Francisco to Marin County in the north and to the Peninsula in the south. Access to and from US 101 in the vicinity of the project site is via the Cesar Chavez Street interchange for both northbound and southbound traffic. In the vicinity of the proposed project, US 101 is an 8-lane, limited access freeway that connects to I-80 west of the Bay Bridge. Between I-80 and the Golden Gate Bridge, US 101 continues through San Francisco as a 6-lane surface roadway along Van Ness Avenue, Lombard Street, and Doyle Drive. According to traffic counts conducted by Caltrans in 2002, US 101 carries an average of 249,000 vehicles per day in the vicinity of the project site. US 101 is also the primary route serving the San Francisco International Airport (SFO).

Interstate 80. Interstate 80, which merges with US 101 north of Hunters Point Shipyard and southwest of downtown, is generally an east–west freeway, extending from downtown San Francisco in the west, to Sacramento and beyond to the east. The Bay Bridge is located along this freeway, connecting San Francisco with the East Bay. Per Caltrans, 2002 average daily traffic counts, average daily traffic across this 10-lane bridge is approximately 173,000 vehicles.

8.10.2.2.2 Local Roadway Facilities. San Francisco has an extensive street grid system that connects the proposed project to downtown, neighboring communities, and the major freeways described above. This network is categorized into three primary classifications: major arterial roadways, secondary arterial roadways, and local roadways. Major arterial roadways collect and distribute freeway-bound traffic to accommodate intra-city travel and other medium- and long-distance trips. Secondary arterial roadways collect and distribute traffic generated in the area by major arterial roadways.

Major and secondary arterial roadways within the study area that provide access to and from the project area include Third Street, Bayshore Boulevard, Cesar Chavez Street, 24th Street, and 25th Street. These roadways are briefly described below, while Figure 8.10-2 shows the arrangement of the local roadway network in the vicinity of the project site. Table 8.10-2 provides classification and traffic volume data for the local and regional roadways.

TABLE 8.10-2
Characteristics of Roadways in Project Study Area

Name	Classification	Average Daily Traffic Volume
Local Roadways		
Third Street [a]	Major Arterial	21,000
Evans Avenue [a]	Major Arterial	14,600
Cesar Chavez Street [a]	Major Arterial	12,000
Illinois Street [a]	Collector Road	3,400
Cargo Way [a]	Secondary Arterial	8,800
Regional Roadways		
Interstate 280[b]	Freeway	92,000
U.S. 101[b]	Freeway	249,000
I-80[b]	Freeway	173,000

Notes:
[a] Source: Korve Engineering, 1999
[b] Source: State of California, Department of Transportation (Caltrans), 2002

Third Street. Third Street functions as the principal north-south arterial within the study area. Third street extends north from its interchange with US 101 and Bayshore Boulevard to its intersection with Market Street. It serves as the main commercial street, as well as a primary access route to industrial development along San Francisco's southern waterfront, carrying approximately 21,000 vehicles per day (Korve Engineering, 1999). The Transportation Element of the San Francisco General Plan designates Third Street as a Major Arterial and Primary Transit Route (CCSF Planning Department, 1995). The plan also names Third Street as a Neighborhood Commercial Street and a Citywide Bicycle Route.

In terms of physical design, Third Street in the project area is undergoing construction for the Third Street Light Rail Transit (LRT) Improvement Project. Currently, Third Street is being reconstructed from a 6-lane arterial to a 4-lane arterial with two 11-foot-wide traffic lanes and an 8-foot shoulder in each direction. A center median would contain two LRT tracks. In addition, separate left-turn storage lanes are provided at intersections with major arterial roadways but are not provided at minor street intersections. On-street parking is generally allowed on both sides of the street.

As of December 2003, the Third Street LRT construction ended at 22nd Street; however, full LRT extension to the southern City limits will be completed and in operation by late 2005 (Mr. Drew Howard, MUNI, February 2004).

Cesar Chavez Street. Cesar Chavez Street (formerly Army Street) is a major arterial and a Citywide Bicycle Route carrying approximately 12,000 vehicles per day (Korve Engineering, 1999). This 4-lane major arterial extends to the west, traversing the Mission District until Guerrero Street, where it becomes a local street. Cesar Chavez Street provides direct access to both I-280 and US 101. Vehicles exiting on Cesar Chavez Street, going eastbound, from southbound US 101 are subject to an exit ramp with a tight turn radius. This ramp may be considered to be dangerous by some drivers due to its tight turn radius; and it may not be accessible for most trucks due to horizontal and vertical constraints (curve radius and overhead clearance). Cesar Chavez Street proceeds to Third Street, from which vehicles traveling to the proposed project site can continue north to 23rd Street to access the SFERP facility.

23rd Street. Twenty-third Street provides direct access to the project site, as well as access to adjacent industrial properties. This roadway is undivided and provides one lane of travel in each direction. In addition, there is on-street parking on both sides of the street, and there is a posted speed limit of 25 miles per hour (mph). A traffic signal exists at the intersection of Third Street and 23rd Street.

25th Street. Twenty-fifth Street would provide direct access to the construction lay down area (i.e., staging and construction worker parking area), and access to other adjacent industrial properties. This roadway is undivided and provides one lane of travel in each direction. In addition, there is on-street parking on both sides of the street, and there is a posted speed limit of 25 miles per hour (mph). A traffic signal exists at the intersection of Third Street and 25th Street. Access to I-280 is provided via 25th Street, which leads directly to I-280 northbound at Indiana Street, or via Pennsylvania Avenue to reach I-280 southbound. Traffic headed northbound on US 101 can access the ramp directly from Cesar Chavez Street westbound. However, traffic headed southbound must turn around at Bryant Street and return eastbound along Cesar Chavez Street.

Illinois Street. Illinois Street is a wide 2-lane undivided roadway west of the project site. Illinois Street carries approximately 3,400 vehicles per day (Korve Engineering, 1999). Traffic is controlled at the intersections of Illinois Street and 23rd and 25th streets by a two-way stop sign with 23rd and 25th streets serving as the minor (stopped) streets. Land uses along this street in the immediate vicinity of the proposed project consist of warehouses and industrial uses.

8.10.2.3 Existing and Future Baseline Intersection Levels of Service

Per guidance from the City's DPT, level of service (LOS) is a measure of average control delay at an intersection. Level of service is identified through a letter designation, varying from LOS A (less than 10 seconds of delay) to LOS F (greater than 80 seconds of delay) as described in Table 8.10-3. For urban settings, LOS E (delays of 55 to 80 seconds) represents the least tolerable acceptable condition.

TABLE 8.10-3
Level of Service Criteria for Signalized Intersections

Level of Service	Average Delay (seconds per vehicle)	Traffic Flow Characteristics
A	≤ 10	Most vehicles arrive during the green phase and do not stop at all.
B	> 10 to ≤ 20	More vehicles stop, causing higher delay.
C	> 20 to ≤ 35	Vehicle stopping is significant, but many still pass through the intersection without stopping.
D	> 35 to ≤ 55	Many vehicles stop, and the influence of congestion becomes more noticeable.
E	> 55 to ≤ 80	Very few vehicles pass through without stopping.
F	> 80	Considered unacceptable to most drivers; intersection is not necessarily over capacity even though arrivals exceed capacity of lane groups.

Source: HCM, Transportation Research Board, 2000

This analysis focuses on the following study area intersections during a typical weekday peak hour between 7:00 a.m. to 9:00 a.m., and 4:00 p.m. to 6:00 p.m.

- Third Street/16th Street
- Third Street/20th Street
- Third Street/25th Street
- Third Street/Cesar Chavez Street
- Third Street/Evans Avenue
- Evans Avenue/Cesar Chavez Street

Traffic conditions were evaluated using the Synchro level of service software (Trafficware, Version 5). Synchro is a traffic operations analysis tool that incorporates the methodology of Transportation Research Board's 2000 *Highway Capacity Manual* (TRB, HCM2000). This program assigns a LOS designation based upon average vehicle delay. This methodology complies with the evaluation requirements of the City DPT. Intersection conditions were evaluated for the following scenarios:

- Existing (2000) conditions
- Baseline (2005) conditions

- Baseline plus Project Construction Phase conditions
- Cumulative (2015) conditions.

8.10.2.3.1 Existing Conditions. Figure 8.10-3 illustrates the existing a.m. and p.m. peak hour traffic volumes, intersection geometrics and controls, while Table 8.10-4 shows the results of the existing condition traffic analysis. Under existing conditions, the studied intersections operate at LOS D or better for both the a.m. and p.m. peak periods. The intersections within proximity to the project, Third Street/20th Street and Third Street/25th Street currently operate at LOS A and LOS B during the a.m. and p.m. peak hours, respectively. The intersection of Third Street/Evans Avenue operates at LOS D (37.3 seconds delay) during the a.m. peak hour.

TABLE 8.10-4
Level of Service Summary for Existing, Baseline 2005, and Cumulative (2015) Conditions

Intersection	Peak Hour	Existing (2000)		Baseline (2005)		Cumulative (2015)	
		LOS	Delay [a]	LOS	Delay [a]	LOS	Delay [a]
Third Street/16th Street	a.m.	B	12.1	B	16.8	C	25.7
	p.m.	B	14.5	B	16.7	C	22.0
Third Street/20th Street	a.m.	A	3.1	A	2.7	C	20.1
	p.m.	A	2.8	A	3.6	C	27.4
Third Street/25th Street	a.m.	B	11.9	A	6.7	B	13.2
	p.m.	B	11.3	A	8.2	B	11.7
Third Street/Cesar Chavez Street	a.m.	C	27.1	C	28.3	D	39.9
	p.m.	C	24.5	C	31.0	D	40.0
Third Street/Evans Avenue	a.m.	D	37.3	D	39.6	D	44.7
	p.m.	C	24.0	C	26.5	D	36.0
Evans Avenue/Cesar Chavez Street	a.m.	B	13.6	B	14.0	B	16.6
	p.m.	B	19.4	C	26.6	C	31.1

Note:
[a] Delay in seconds per vehicle.

8.10.2.3.2 Baseline (2005) Conditions. Future a.m. and p.m. peak hour turn movement counts for cumulative year 2015 were provided from the DPT and incorporated into the project's traffic analysis. The cumulative 2015 traffic volumes provided the basis of estimating the 2005 traffic volumes. The 2015 traffic volumes are based on growth and development trends in the Potrero Hill area of the City as determined by DPT transportation modeling staff. Background (2005) a.m. and p.m. peak hour volumes, consistent with the planned year of project construction, were interpolated assuming straight line growth from existing (2000) and future (2015) volumes. Based on the interpolation of DPT's cumulative traffic volumes, the average growth rate applied at the intersection traffic volumes in the study area is approximately 2.6 percent per year.

Figure 8.10-4 illustrates the 2005 baseline (without project construction traffic) a.m. and p.m. peak hour traffic volumes, intersection geometrics and controls, while Table 8.10-4 shows the results of the 2005 baseline traffic analysis. No additional intersection improvements are

planned for the study area intersections, and therefore, the intersection geometrics remain the same as the existing condition. Based on the LOS analysis of the 2005 baseline conditions, all of the study area intersections are forecast to continue to operate at LOS D or better for both a.m. and p.m. peak hours.

8.10.2.3.3 Cumulative (2015) Conditions. As previously stated, cumulative 2015 peak hour traffic volumes were provided by the DPT and based on growth and development trends in the Potrero area of the City as determined by DPT transportation modeling staff. The 2015 traffic condition would be associated with the operations of the proposed project. The operations of the proposed project would generate a total of 100 daily trips, 20 a.m. peak hour, and 20 p.m. peak hour trips. This addition of traffic on the study area would have an immeasurable effect on intersection LOS once the trips are distributed throughout the street network.

Figure 8.10-5 illustrates the 2015 cumulative a.m. and p.m. peak hour traffic volumes, intersection geometrics and controls, while Table 8.10-4 provides the 2015 intersection LOS at the study area intersections. Other than the operation of the MUNI N-Judah light rail line through the center median of Third Street, no additional intersection improvements are planned for the study area intersections. Based on the LOS analysis of the 2015 cumulative conditions, all of the study area intersections are forecast to continue to operate at LOS D or better for both a.m. and p.m. peak hours. Additional traffic from operations will have no significant impact on LOS.

8.10.2.4 Public Transportation

San Francisco is a transit hub served by local and regional bus, rail, and ferry services. Regional service connects downtown San Francisco with the surrounding suburban areas. San Mateo County Transit District (SamTrans) and Bay Area Rapid Transit (BART) serve the Peninsula communities south of the SFERP facility. AC Transit buses and BART serve the East Bay, while Golden Gate Transit serves the North Bay communities. Ferry service also carries passengers to downtown San Francisco from coastal North and East Bay communities. In central eastern San Francisco, BART runs north-south along Mission Street, with the station nearest to the project site located at 24th Street.

8.10.2.4.1 San Francisco Municipal Railway. The San Francisco Municipal Railway (MUNI) currently carries 219 million passengers per year on 85 transit lines. The system provides approximately 5,300 stops throughout San Francisco, with lines providing extensive coverage to all San Francisco neighborhoods. MUNI connects with other Bay Area transit service providers at major transfer centers including the Ferry Building, Transbay Terminal, Embarcadero, and Civic Center BART stations along Market Street, and the Stonestown Shopping Center, and the Daly City BART station.

Major MUNI routes in the vicinity of the project site serve both north-south travel originating in downtown San Francisco or San Mateo counties, and cross-town travel. Below are descriptions of the major routes that serve these travel patterns. Route N – Judah serves as the only light-rail transit (LRT) in the study area, while other MUNI routes are bus routes.

Route N – Judah (Light-rail Transit). This LRT route currently travels in a general east-west fashion from Ocean Beach, through downtown and the Embarcadero, to the Caltrain station at Fourth and King streets. Route N has major stops at the MUNI and BART stations at Van Ness, Civic Center, Powell, Montgomery, and Embarcadero. Route N provides 5- to 9-minute headways during the a.m. peak period, and 4- to 12-minute headways during the p.m. peak period.

The extension of the MUNI Third Street LRT Line past the Caltrain Station, south to the southern City limits, is currently under construction in the vicinity of the project site. According to MUNI, specific portions of this extension project would be completed and operational in 2004, with full completion of the extension to the City's southern limits by late 2005 (Howard, 2004).

Route #15 - Third Street. This route functions as the primary transit line serving the Central Basin and Hunters Point regions. It carries passengers through downtown San Francisco, extending north to Fisherman's Wharf and south to Hunters Point. Route #15 allows connections with other transportation services that reach throughout the Bay Area including Caltrain (terminal at 4th and Townsend streets and Paul Avenue station), BART, and the MUNI subway system (via the Montgomery and Embarcadero stations). Route #15 provides frequent service with articulated buses, running on 5- to 8-minute intervals during peak hours and 10- to 15-minute intervals during off-peak hours. By mid 2004, a portion of the Route N LRT extension will be completed, and will provide service along the Embarcadero in lieu of the current Route #15 lines.

Route #22 – Fillmore. This route travels from Fillmore and Bay streets in the Marina District south through Pacific Heights and Mission Dolores before heading southeast to Third Street. The route turns north at 20th Street, stopping 2 blocks from the proposed project site. Route #22 provides service at 7- to 12-minute intervals during the a.m. peak period and at 5- to 11-minute intervals during the p.m. peak period.

Route #48 – Quintara/24th Street. This route provides crosstown service from the West Portal community to Potrero Hill. This line accesses the MUNI subway at the West Portal Station, as well as BART at 24th and Mission Streets. Passengers are transported within one block of the proposed project site, with a stop at 22nd and Illinois Streets. This line also connects to Route #15 and Route #9, while passing near Caltrain's 22nd Street depot. Route #48 offers service at 6- to 15-minute intervals during the a.m. peak period, and at 10- to 12-minute intervals during the p.m. peak period.

8.10.2.4.2 Caltrain. Caltrain provides commuter rail service between Santa Clara, San Mateo, and San Francisco counties. The station closest to the project site is the 22nd Street and Pennsylvania Avenue station. This station is approximately 6 blocks west of the proposed project along MUNI Route #48, described above. During the week, trains connect this station to Peninsula communities, while all 32 trains continue northbound to the final Caltrain stop at 4th and Townsend Streets. Service runs on 30-minute intervals during the a.m. and p.m. peak periods. During the weekends, 13 trains run approximately every hour on Saturday, while 10 trains run every 1 to 2 hours on Sunday. Currently, however, weekend train service is suspended till approximately spring 2004 for construction associated with new Caltrain express train service.

8.10.2.4.2 Bay Area Ferries. Ferry service is provided between Vallejo, Alameda, Oakland, Tiburon, Sausalito, and downtown San Francisco. Presently MUNI Route #15 provides connections to ferry services only in Fisherman's Wharf and at Piers 41 and 43. In the project vicinity, MUNI Route #15 operates southbound on Second Street and northbound on Third Street. In 2004, MUNI's new Third Street LRT will provide service to Bay Area ferries via connections along the Embarcadero. The following describes the five ferry service providers in the project area.

Vallejo Baylink Ferry. The Red and White Fleet operates this limited commute ferry service from Vallejo to the San Francisco Ferry Building. There are currently 15 trips per weekday in each direction, four of which are via bus, and nine trips per day on weekends, one of which is via bus.

Alameda and Oakland Ferry Service. The Blue and Gold Fleet operates this service, with ferries departing from Alameda and Oakland's Jack London Square for both the San Francisco Ferry Building and Pier 41/Fisherman's Wharf. Thirteen inbound and outbound trips each weekday serve the Ferry Building while 7 inbound and 5 outbound trips serve Pier 41. On the weekends, 4 inbound trips and 5 outbound trips serve the Ferry Building while 6 inbound and outbound trips serve Pier 41.

Harbor Bay Ferry. This ferry provides weekday commuter service between Alameda and the San Francisco Ferry Building. There are six inbound trips and six outbound trips per day.

Red and White Fleet. The Red and White Fleet provides ferry service from San Francisco to Tiburon and Sausalito, Service to these locations is provided from both the Ferry Terminal (during peak commute hours) and from Fisherman's Wharf at Pier 43. Five ferries in each direction travel between San Francisco and Tiburon/Sausalito.

Golden Gate Ferry. This ferry provides daily service between Larkspur and Sausalito in Marin County and the San Francisco Ferry Building. The Larkspur Ferry runs 21 inbound and outbound trips (one trip in each direction is via bus) on weekdays with one Friday night late ferry in each direction during summer months. On weekends and holidays, there are 5 inbound and outbound trips running on 2-hour intervals during the day. The Sausalito Ferry runs 9 trips in each direction on weekdays with a 10th trip provided during summer months. On weekends and holidays, there are 6 trips in each direction with a 7th trip during summer months.

8.10.2.5 Bicycle and Pedestrian Circulation

There are currently several signed on-street bicycle routes in the project vicinity, but no existing pedestrian trails. A Class III route (on-street bike route; signs only) circles around 3Com Park and connects to Third Street, via Gilman, Carroll, Thomas, and Revere avenues. Within the project vicinity, the *San Francisco Master Plan* designates Evans Avenue, Innes Avenue, Cesar Chavez Street, and Third Street as Citywide Bicycle Routes.

Additionally, by August 2004, DPT will be providing Class II (striped) bike lanes on Illinois Street. With the construction of the Third Street Light Rail Line discussed above, cyclists traveling north and south in the Third Street – Illinois Street Corridor would be subject to unsafe conditions on Third Street. Illinois Street is the logical replacement for Third Street as a bicycle route, Illinois Street is one block to the east, and connects to other bicycle routes to the north and south. Since Illinois Street is part of the Bay Trail Plan (see below), the bike lanes would form a continuous connection between Islais Creek and North Beach on bike lanes or paths (Class I, off-street).

Sidewalks exist along Third Street, and with the completion of the Third Street LRT project, more pedestrians are anticipated along Third Street. Sidewalks do not exist on 22nd or 23rd streets, with shops abutting directly onto the street. Parking space is available on both sides of these streets, requiring that pedestrians walk within travel lanes.

8.10.2.5.1 Bay Trail Plan. The Bay Trail Plan was adopted by the Association of Bay Area Governments in 1989 pursuant to Senate Bill 100, and provides an alignment that connects the nine-county Bay Area region with a multi-purpose hiking and bicycle trail, along with a set of policies to guide implementation. Consistent with the Bay Trail Plan, Illinois Street is a designated bikeway in the draft Central Waterfront Neighborhood Plan. Illinois Street in the vicinity of the project site is the designated Bay Trail. However, no dedicated facilities (e.g., a striped bike lane) are currently provided in the vicinity of the project.

The Bay Trail Plan proposes an alignment for what will become a 400-mile recreational "ring around the Bay." Approximately one-third of the trail already exists, either as hiking-only paths, hiking and bicycling paths or as on-street bicycle lanes. When completed, the Bay Trail will create connections between more than 130 parks and publicly-accessible open space areas around San Francisco and San Pablo Bays.

8.10.2.6 Airports

San Francisco International Airport (SFO) is approximately 15 miles south of the proposed project site on US 101. SFO can also be reached via BART (transit) and Interstate 380 (I-380) that connects to I-280 (vehicles). In addition, Oakland International Airport (OAK) sits across the Bay, accessible via BART and I-80 across the Bay Bridge, connecting to Interstate 880 (I-880). San Jose International Airport (SJC) lies farther south, accessible via Caltrain and US 101 or I-280.

8.10.2.7 Goods Movement

8.10.2.7.1 Freight Rail Service. Currently no active freight rail service is provided in the immediate vicinity of the proposed project. There is an inactive railroad track operated by the Southern Pacific Corporation (SP) via trackage rights from Caltrain, which connect the Caltrain mainline tracks to the south gate of Hunters Point Shipyard. Currently, the Port of San Francisco (Port) is planning to re-orient freight rail service from Mission Bay to the Port of San Francisco waterfront via the future Illinois Street rail/bicycle bridge.

Immediately north of Hunters Point Shipyard and the India Basin, an Intermodal Container Transfer Facility (ICTF) branch track serves the Evergreen Pier 90 to Pier 96 area. The ICTF branch diverges from the Caltrain mainline just north of Tunnel #3 in the northbound direction.

8.10.2.7.2 Truck Access. The largely industrial land uses near the project site generate truck traffic. A designated truck route between US 101 and I-280 and the project site exists along Cesar Chavez Street, Evans Avenue, and Third Street (north of Evans Avenue). Trucks weighing more than 11,000 pounds are prohibited on Third Street between Evans Avenue and Carroll Avenue, and no through trucks are allowed on Third Street between Jamestown Avenue and Jerrold Avenue.

8.10.2.8 Planned Transportation Improvements

8.10.2.8.1 Third Street Light Rail Project. The MUNI Third Street Light Rail Transit (LRT) Line is currently under construction within the vicinity of the proposed project. This MUNI project will provide a light rail line down Third Street to the City's southern limit, and provide a 4-lane arterial with two 11-foot-wide traffic lanes and 8-foot shoulders in each

direction. An approximately 32-foot-wide center median would contain two LRT tracks for the future extension of the MUNI N Line. As of December 2003, the Third Street LRT construction ended at 22nd Street; however, full LRT extension to the southern City limits will be completed and in operation by late 2005 (Howard, 2004).

In the vicinity of the project, left-turn lanes will remain on Third Street for Evans, Cesar Chavez Street, 25th Street (northbound only), 23rd Street, and 20th Street. In addition to the light rail line, the project area includes a new Metro East Operating and Maintenance Facility at Illinois and 25th streets. This facility would store, maintain, and dispatch light rail vehicles on a site of approximately 13 acres.

8.10.2.8.2 Bicycle Facility Improvements. DPT's Bicycle Program Manager provided the following information on planned bicycle facility improvements. (Tannen, 2003).

Illinois Street Bicycle Route (16th Street to Cesar Chavez Street). DPT received a Transportation Funding for Clean Air (TFCA) grant from the Bay Area Air Quality Management District (BAAQMD) to provide Class II (striped) bike lanes on Illinois Street. With the construction of the Third Street Light Rail Line, cyclists traveling north and south in the Third Street – Illinois Street Corridor would be subject to unsafe conditions on Third Street. Illinois Street is the logical replacement for Third Street as a bicycle route. It is one block to the east and connects to other bicycle routes to the north and south.

In addition, Illinois Street is part of the Bay Trail bicycle route in San Francisco. The Illinois Street bike lanes would form a continuous connection between Islais Creek and North Beach on bike lanes or paths (Class I, off-street). The bicycle connection would include the future (funded) Illinois Street Bridge over Islais Creek, the existing Terry A. Francois Boulevard bike lanes, the Pac Bell Park Promenade, and The Embarcadero Promenade bike lanes for a total of 4.75 miles. The Illinois Street bike lanes project will be completed by August 2004.

Cesar Chavez Street Bicycle Route (US 101 to I-280). The Cesar Chavez Street bike route would provide for Class II (striped) bike lanes on Cesar Chavez Street, between US 101 and I-280. As a result of this project, existing on-street parking on the north side of Cesar Chavez Street (westbound) would be removed. Colored bike lane treatments across the US 101 and I-280 on- and off-ramps would also be used to help highlight the presence of bicycles across these potential high-conflict areas. This segment would make use of the existing asphalt path underneath US 101. Other crossing treatments would be needed to allow bicyclists to cross safely.

8.10.3 Environmental Consequences

This subsection discusses potential environmental impacts of the proposed project. Potential traffic impacts during construction of the plant, as well as plant operation after construction, have been analyzed. Significance criteria were developed based upon Appendix G of the CEQA *Guidelines*, which identifies significant impacts to be caused by a project if it results in an increase in traffic that is substantial relative to the amount of existing traffic and the capacity of the surrounding roadway network. In addition, impacts are assessed in accordance with the criteria used by the City Planning Department. The more stringent of these two sets of criteria were used to determine project-related impacts.

Project area reconnaissance was performed by CH2M HILL in November 2003 to examine the proposed project area, document roadway characteristics, identify physical constraints, and assess general traffic conditions.

When completed, the operational phase of the proposed project would generate approximately 20 additional employee commutes and other off-peak hour trips (i.e., materials deliveries, visitors, business-related trips), or 100 daily trips. During the peak construction phase, the project is expected to generate approximately 484 average daily construction worker trips. To analyze the "worst-case" scenario, traffic impacts associated with construction traffic were analyzed. Consequently, a quantitative traffic analysis was not conducted for the long-term operations phase since it would generate a low volume of peak hour trips (20 a.m. and 20 p.m. peak hour employees trips). This would not have a measurable impact on the study area intersections.

8.10.3.1 Thresholds of Significance

The following presents the significance criteria regarding transportation used by the Planning Department for the determination of impacts associated with a proposed project:

- The operational impact on signalized intersections is considered significant when project-related traffic causes the intersection level of service to deteriorate from LOS D or better to LOS E or F, or from LOS E to LOS F. The project may result in significant adverse impacts at intersections that operate at LOS E or F under existing conditions depending upon the magnitude of the project's contribution to the worsening of the average delay per vehicle. In addition, the project would have a significant adverse impact if it would cause major traffic hazards or contribute considerably to cumulative traffic increases that would cause deterioration in levels of service to unacceptable levels.

- San Francisco does not consider parking supply as part of the permanent physical environment. Parking conditions are not static, as parking supply and demand varies from day-to-day, from day-to-night, from month-to-month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel.

- The project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service; or cause a substantial increase in delays or operating costs such that significant adverse impacts in transit service levels could result. With the MUNI and regional transit screenlines analyses, the project would have a significant effect on the transit provider if project-related transit trips would cause the capacity utilization standard to be exceeded during the PM peak hour.

- The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.

- The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.

- Loading impacts were assessed by comparing the proposed loading space supply to the *Planning Code* requirements and by the estimated loading demand during the peak hour of loading activities.
- Construction-related impacts generally would not be considered significant due to their temporary and limited duration.

8.10.3.2 Intersection Levels of Service

8.10.3.2.1 Construction Impacts. Peak hour traffic operations were evaluated for the weekday a.m. and p.m. peak periods (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) for the local roadway network adjacent to the project site during construction. The peak hour analysis examined the worst-case scenario of the impact of 258 daily employees during construction of the project.

Trip Generation. Construction of the proposed project is anticipated to begin in 2005 and last approximately 12 to 14 months. A peak workforce is approximately 258 workers per day over a 2-month period during months 6 and 7 of construction.

Construction would generally be scheduled to occur between 7:00 a.m. and 8:00 p.m., 5 days a week, although additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Based on the regular schedule, most worker trips to the project site would occur during the a.m. (inbound to site) and p.m. (outbound from site) peak commute hours. The delivery of construction materials and the hauling of materials from the project site would also occur during the day, but not during the peak hours. Table 8.10-5 summarizes the total daily and peak-hour construction vehicle trip generation for the peak construction period.

TABLE 8.10-5
Construction Trip Generation for the Proposed Project

		AM Peak Hour		PM Peak Hour	
Vehicle Type	**ADT**	**In**	**Out**	**In**	**Out**
Construction Personnel [a]	484	226	11	11	226
Delivery Trucks [b]	10	0	0	0	0
Heavy Vehicles and Trucks	30	0	0	0	0
Total	**524**	**226**	**11**	**11**	**226**

Source: CH2M HILL, 2004

[a] Approximately 10 construction personnel trips (5 inbound and 5 outbound) associated with lunch and other business-related trips would occur from 9:00 a.m. to 4:00 p.m. (outside of peak hours)
[b] Delivery and other truck trips would occur on weekdays, from 9:00 a.m. to 4:00 p.m. (outside of peak hours)

During the peak construction period, using a average vehicle occupancy (AVO) factor of 1.14 persons per vehicle for commuting (National Personal Transportation Survey, Table 7.16, Average Vehicle Occupancy by Trip Purpose, FHWA, 1990), construction workers would generate an estimated 484 daily trips, 237 a.m. peak hour trips, and 237 p.m. peak hour trips. During this period, approximately 40 truck trips would occur (inbound and outbound trips for 5 delivery trucks to plant site, 8 heavy trucks to plant site, and 7 heavy

trucks to pipeline construction areas), with no truck trips occurring during the a.m. and p.m. peak commute periods. Also, approximately 10 construction personnel trips (5 inbound and 5 outbound) associated with lunch and/or business-related trips would occur outside of the peak hours. Therefore, the total peak construction trip generation would be 524 daily trips, 237 a.m. peak hour trips, and 237 p.m. peak hour trips.

Trip Distribution. Trip distribution percentages for the construction employees are based on assumptions of regional demographics of construction workers, review of existing traffic counts from DPT, and recent surveys of the project site (i.e., drive-by windshield surveys). The construction worker trip distribution has been determined to be: 25 percent within the City of San Francisco (local trips); 15 percent would originate in Marin County and points north; 40 percent would originate from the East Bay; and the remaining 20 percent would originate from San Mateo County and points south.

To arrive at the construction lay down area, two blocks south of the project site, construction worker trips from Marin County would use US 101 and exit on Cesar Chavez Street and proceed to Third Street. Trips from the East Bay would use I-80 to US 101, and exit on Cesar Chavez Street. Trips from within the City would use 16th Street and Third Street to reach project location. Trips from San Mateo County would use I-280, exit at Evans Avenue and Third Street. The construction crew for the pipeline facilities (crew of eight workers) would be staged in appropriate areas adjacent to pipeline construction activities.

Figure 8.10-6 illustrates the construction worker trip assignment that incorporates the trip generation and the distribution of construction workers. These volumes serve as the basis for the traffic impact analyses to determine the LOS impacts likely to be imposed by construction of the proposed project.

Background plus Project Conditions. As previously discussed, the proposed project would add approximately 237 a.m. and 237 p.m. peak hour trips to the study area street network in the 2005 construction year. These peak hour trips were added to the 2005 baseline condition, and Figure 8.10-7 illustrates the 2005 plus project construction traffic a.m. and p.m. peak hour volumes, as well as the intersection geometrics and traffic controls. Table 8.10-6 summarizes the intersection LOS for the 2005 plus construction traffic condition.

TABLE 8.10-6
Level of Service Summary for 2005 Plus Project Construction Conditions

		Baseline (2005)		2005 Plus Project	
Intersection	**Peak Hour**	**LOS**	**Delay***	**LOS**	**Delay ***
Third Street/16th Street	a.m.	B	16.8	C	23.8
	p.m.	B	16.7	B	18.2
Third Street/20th Street	a.m.	A	2.7	A	5.4
	p.m.	A	3.6	A	3.2
Third Street/25th Street	a.m.	A	6.7	A	7.3
	p.m.	A	8.2	B	13.1
Third Street/Cesar Chavez Street	a.m.	C	28.3	D	52.8
	p.m.	C	31.0	D	39.6

TABLE 8.10-6
Level of Service Summary for 2005 Plus Project Construction Conditions

		Baseline (2005)		2005 Plus Project	
Intersection	**Peak Hour**	**LOS**	**Delay***	**LOS**	**Delay ***
Third Street/Evans Avenue	a.m.	D	39.6	D	43.2
	p.m.	C	26.5	C	32.4
Evans Avenue/Cesar Chavez Street	a.m.	B	14.0	B	16.7
	p.m.	C	26.6	C	23.1

Note:

* Delay in seconds per vehicle

Based on the traffic analysis, addition of the construction worker traffic volumes would change LOS during one or both peak hours at the following intersections:

- Third Street/16th Street: LOS B to LOS C in the a.m. peak hour
- Third Street/25th Street: LOS A to LOS B in the p.m. peak hour
- Third Street/Cesar Chavez Street: LOS C to LOS D in the a.m. and p.m. peak hours

Although the construction trips associated with the project would change LOS at these intersections, all study area intersections are forecast to continue to operate at LOS D or better. Therefore, the addition of project construction traffic would have a less-than-significant impact on intersection levels of service in the study area. In addition, it is important to note that this peak construction activity would only occur for a 2-month period.

Construction impacts related to the WPS and process water supply pipeline component are primarily related to the placement pipeline and associated materials along streets in the study area. A crew of eight pipeline construction personnel would be working during the peak months (months 6 and 7). This crew would park adjacent to their worksites, rather than the laydown area on 25th Street. The construction methods for the pipeline would consist of open-cut trenching and tunneling methods such as microtunneling or jack-and-bore along the following roadway segments:

- Marin Street, west of Mississippi Street
- Mississippi Street, Cesar Chavez Street to Marin Street
- Cesar Chavez Street, Mississippi Street to Indiana Street
- 23rd Street, Indiana Street to project site

The project would be required to prepare a Traffic Management Plan (TMP) to offset traffic impacts associated with construction of the pipeline. The 7 a.m. peak hour, and 7 p.m. peak hour trips (using 1.14 AVO for eight workers) would not have a measurable impact on the streets in the study area.

The roadways providing access to the project site and plant and pipeline lay down areas would continue to provide adequate capacity to accommodate the additional vehicle trips expected during construction. A TMP will be required to address the potential impacts to affected streets due to the installation of the WPS and process water supply pipeline. Therefore, impacts during construction are expected to be less-than-significant.

8.10.3.2.2 Operational Impacts. The permanent addition of 20 employees and other plant-associated trips (i.e., materials deliveries, visitors, business-related trips) for operations would generate 100 daily, 20 a.m. peak hour, and 20 p.m. peak hour trips. Once these trips are distributed on the study area network, they would result in a less-than-significant impact, as their traffic volumes would be immeasurable in terms of intersection LOS. The remaining 60 non-peak hour trips would be associated with regular plant deliveries, visitors, and employee business-related trips. Since these trips would be spread throughout the day, and would not occur during the peak commute hours, they would also have a less-than-significant impact on traffic operations.

8.10.3.3 Parking Facilities

Construction of the proposed project would not impact on-street parking. A vacant lot to the south of the project site at Maryland Street/25th Street will be used as a lay down area (staging, and construction worker parking lot) for the construction worker parking demand. From the lay down area, construction workers would be bussed two blocks north (via Illinois Street) to the project site.

When completed, the project would contain adequate onsite parking to accommodate the permanent 20 employees. In addition, street parking will continue to be available along Illinois Street and 23rd Street. Street parking spaces would not be eliminated as part of the proposed project. Therefore, no significant impacts to parking are anticipated.

8.10.3.4 Public Transportation

MUNI Route 48 has a stop at Illinois Street/22nd Street, which is the nearest stop to the project site. Approximately 23 percent (58 employees) of the construction workforce is anticipated to either carpool or use alternative transportation modes to and from the project site, and the remaining 192 employees would drive their automobiles to the lay down area. A portion of the 58 construction workers and a portion of the 20 permanent employees would not significantly impact the operations of MUNI bus routes, and the future Third Street Light Rail Line (for permanent employees).

8.10.3.5 Bicycle and Pedestrian Circulation

By 2005, planned bicycle routes on Third Street, Cesar Chavez Street, and Illinois Street will be completed. Pedestrian sidewalks will continue to exist along on Third Street, while Illinois Street, 23rd Street, and 25th Street will offer little space to accommodate pedestrians. Construction-related traffic would be temporary in nature and would circulate during the a.m. and p.m. peak hours only, while operational traffic of the project would be relatively low. The addition of construction and operational traffic is not expected to significantly impact pedestrian or bicycle facilities along Third Street, Cesar Chavez Street, and Illinois Street.

8.10.3.6 Goods Movement

Construction and operation of the proposed project would not impact adjacent freight rail lines, and air or shipping routes. Therefore, the project would not have a significant impact on goods movement.

8.10.3.7 Safety

The roadways in the vicinity of the proposed project site would continue to provide adequate sight distances. Accident rates at nearby intersections are relatively low averaging approximately 2.5 per year (Korve Engineering, 1999). Truck traffic within the area would continue to use designated truck routes (Cesar Chavez Street) to access the proposed project site. In addition, the project site is located in an industrial zone one block east of Third Street, with no neighboring commercial retail businesses or residences. Impacts to vehicle, pedestrian, and bicycle safety as a result of construction and operation of the project would be less-than-significant.

8.10.3.8 Air, Rail, and Waterborne Traffic

The proposed project would have no impacts on air, rail, or waterborne traffic.

8.10.3.9 Hazardous Materials Transport

Construction of the proposed project would generate hazardous wastes consisting primarily of batteries, asbestos containing materials, and various liquid wastes (e.g., cleaning solutions, solvents, paint and antifreeze). Prior to construction, solids from contamination clean-up efforts could be generated.

Operation of the project would result in the generation of additional wastes including lubricants, water treatment chemicals, herbicides and pesticides, and sludge. In addition, operation of the project will require transportation of aqueous ammonia. Aqueous ammonia will be delivered to the plant by truck transport using designated truck routes (see discussion below). The truck loading area will be located within a bermed area adjacent to the storage tank onsite. The use of 29 percent aqueous ammonia will require approximately 14 deliveries of ammonia per year, or 28 truck trips per year. This would equate to approximately 1 to 2 deliveries per month, or 2 to 4 truck trips per month (inbound and outbound). These occasional truck trips would generally occur during the non-peak commute hours. If the plant uses lower concentrations of aqueous ammonia, more frequent delivery would be required.

Standards for the transport of hazardous materials are contained in the Code of Federal Regulations, Title 49 and enforced by the U.S. Department of Transportation. Additionally, the State of California has promulgated rules for hazardous waste transport that can be found in the California Code of Regulations, Title 26. Additional regulations for the transportation of hazardous materials are outlined in the California Vehicle Code (Sections 2500-505, 12804-804.5, 31300, 3400, and 34500-501). The two state agencies with primary responsibility for enforcing federal and state regulations governing the transportation of hazardous wastes are the California Highway Patrol (CHP) and Caltrans.

For those materials that require offsite removal, a licensed hazardous waste transporter would move these substances to one of three Class I hazardous waste landfills in proximity to the project site. Access by waste haulers to the project site would be via Illinois Street. Vehicles can then proceed south along Third Street to Cesar Chavez Street to reach southbound I-280 to US 101 (hazardous wastes cannot be transported on the Bay Bridge (I-80)). Specific outbound truck routes in the City from the project site to southbound I-280 to US 101 are as follows:

1. Project site (23rd Street) to Third Street – southbound
2. Third Street to Cesar Chavez Street – westbound
3. Cesar Chavez Street to Pennsylvania Avenue – northbound
4. Pennsylvania Avenue to I-280 southbound on-ramp
5. I-280 southbound to US 101 southbound

Specific inbound truck routes in the City to the project site from northbound 1-280 from US 101 are as follows:

1. US 101 northbound to I-280 northbound
2. I-280 northbound to Evans Avenue/Cesar Chavez Street off-ramp
3. Evans Avenue – eastbound, to Third Street
4. Third Street – northbound, to project site (23rd Street)

These inbound and outbound truck routes serving the project site to I-280/US 101 would travel through predominantly industrial areas within the City. Once established, these routes would not allow truck travel through sensitive residential neighborhood areas.

For outbound trucks, once on US 101, trucks would proceed around the south end of the Bay to I-580 and I-5 via I-880 and SR 238. Alternatively, haulers could continue through Stockton to State Route 99 (SR 99) that parallels I-5 but runs slightly east through the Central Valley communities of Merced and Fresno. I-5 and SR 99 provide access to California's three Class I hazardous waste facilities including:

- Safety Kleen, Buttonwillow (Kern County)
- Safety Kleen, Imperial County
- Chemical Waste Management, Kettleman Hills (Kings County)

The major highways and interstates that would be used to carry hazardous wastes from the project site to the appropriate landfills contain adequate capacity to accommodate these vehicle trips. Hauling would be carried out in accordance with local, state, and federal regulations that include the Resource Conservation and Recovery Act (42 U.S. Code 6901 et seq.), the California Integrated Waste Management Act (Public Resources Code Sections 40000 et seq.), and the San Francisco Department of Public Health.

In addition, the federal government prescribes regulations for transporting hazardous materials. These regulations are described in the Code of Federal Regulations, Number 49, Part 171. These laws and ordinances place requirements on various aspects of hazardous waste hauling, from materials handling to vehicle signs, to ensure public safety. Transporting and handling of chemicals and wastes are discussed in Subsection 8.12, Hazardous Materials Handling, including the transport of ammonia.

8.10.4 Cumulative Impacts

As described previously, the available capacity of the regional state routes and local roads in the project area shows the regional and local transportation system has the capacity to accommodate future traffic including that resulting from the proposed construction and operation of project.

According to MUNI, the Third Street LRT project is anticipated to be completed and in operation by the end of 2005. Based on discussions with MUNI staff (Velmo Garcia, MUNI,

February 2004), Segment B of the LRT extension (16th Street to 23rd Street) would be completed and in operation by August 2004, while Segment C (23rd Street to Cesar Chavez Street) would be completed and in operation by early 2005. The remaining segments (south to the City limits) would be completed an in operation by late 2005. Segment C is the closest to the project site. Construction of the proposed project in 2005 (construction months 6 and 7), would potentially coincide with the completion stage of Segment C of the LRT project. Since Segment C would be near completion at the time of the peak construction months of the proposed project, it is anticipated that there would be no significant construction timing issues relating to peak hour trips of construction forces and truck trips. There are no other known proposed projects whose workforce and/or material deliveries would concurrently have a significant amount of traffic on the same state routes and local roadways. Therefore, there would be no significant cumulative traffic impacts.

8.10.5 Mitigation Measures

8.10.5.1 Construction Impacts

Construction of proposed project would add a moderate amount of traffic to state routes and local roadways during the peak construction period. However, because existing intersection capacity is adequate, these project-related traffic increases will not result in significant impacts.

During operation and construction, access to the facility will be provided via Third Street to 23rd and 25th streets. The construction contractor will prepare a construction traffic control plan and construction management plan, also known as a Traffic Management Plan (TMP), that addresses timing of heavy equipment and building material deliveries, potential street and/or lane closures associated with pipeline installation, signing, lighting, traffic control device placement, and establishing work hours outside of peak traffic periods.

Methods for mitigating potential traffic impacts caused by construction may include such activities as stationing flag persons at the access road into the site, and placing advance warning flashes, flag persons, and signage along the roadways. Figures 8.10-8 and 8.10-9 illustrate traffic control systems, as developed by Caltrans, that would be implemented during the construction phases of the project. Damage to any roadway opened during construction will be restored to or near its preexisting condition. The construction contractor will work with the local agency's engineer to prepare a schedule and mitigation plan for the roadways along the construction routes.

It should be noted that most trip reduction strategies are not feasible for the construction phase of the project, primarily because of the differing schedules of tradespersons and the need to transport tools and materials to the job site.

8.10.5.2 Operation Impacts

The operations-related and maintenance-related traffic associated with the project is considered to be minimal; state routes and local roadways have adequate capacity to accommodate operations-related traffic. Consequently, no operations-related mitigation measures are required.

8.10.6 Involved Agencies and Agency Contacts

The proposed project lies in proximity to roadways operated by the City of San Francisco. The relevant agencies and appropriate contacts are shown in Table 8.10-7 below.

TABLE 8.10-7
Agency Contacts

Agency	Contact/Title	Telephone
San Francisco, Planning Department	Tim Blomgren Environmental Group 30 Van Ness Avenue, 4th Floor San Francisco, CA 94102	(415) 558-5979
San Francisco County Transportation Authority	Tilly Chang Manager of Planning 100 Van Ness Avenue, 25th Floor San Francisco, CA 94102	(415) 522-4832
San Francisco, Department of Parking and Traffic	Ricardo Olea 25 Van Ness Avenue, Suite 410 San Francisco, CA 94102	(415) 554-2310
Federal Motor Carrier Safety Administration	Bob Brown Materials Specialist 201 Mission Street, Suite 2100 San Francisco, CA 94105	(415) 744-2646

8.10.7 Permits Required and Permit Schedule

Traffic studies for projects in San Francisco require consultation with the City Planning Department to comply with its extensive traffic analysis requirements. The short duration of the construction, in conjunction with the minute permanent addition of 100 trips, impose a relatively insignificant addition to existing traffic levels. The City will consult with Planning Department staff to determine the extent to which the traffic analysis requirements should be applied in the case of the SFERP.

The relevant permits required for work performed within city streets in San Francisco are identified in Table 8.10-8 below.

TABLE 8.10-8
Required Permits

Responsible Agency	Permit/Approval	Schedule
CCSF, Department of Public Works – Bureau of Street-Use and Mapping	Utility Permit	45-60 days
CCSF, Department of Parking and Traffic – Bureau of Traffic Engineering	Extralegal Truck Permit (if necessary)	24 hours

8.10.8 References

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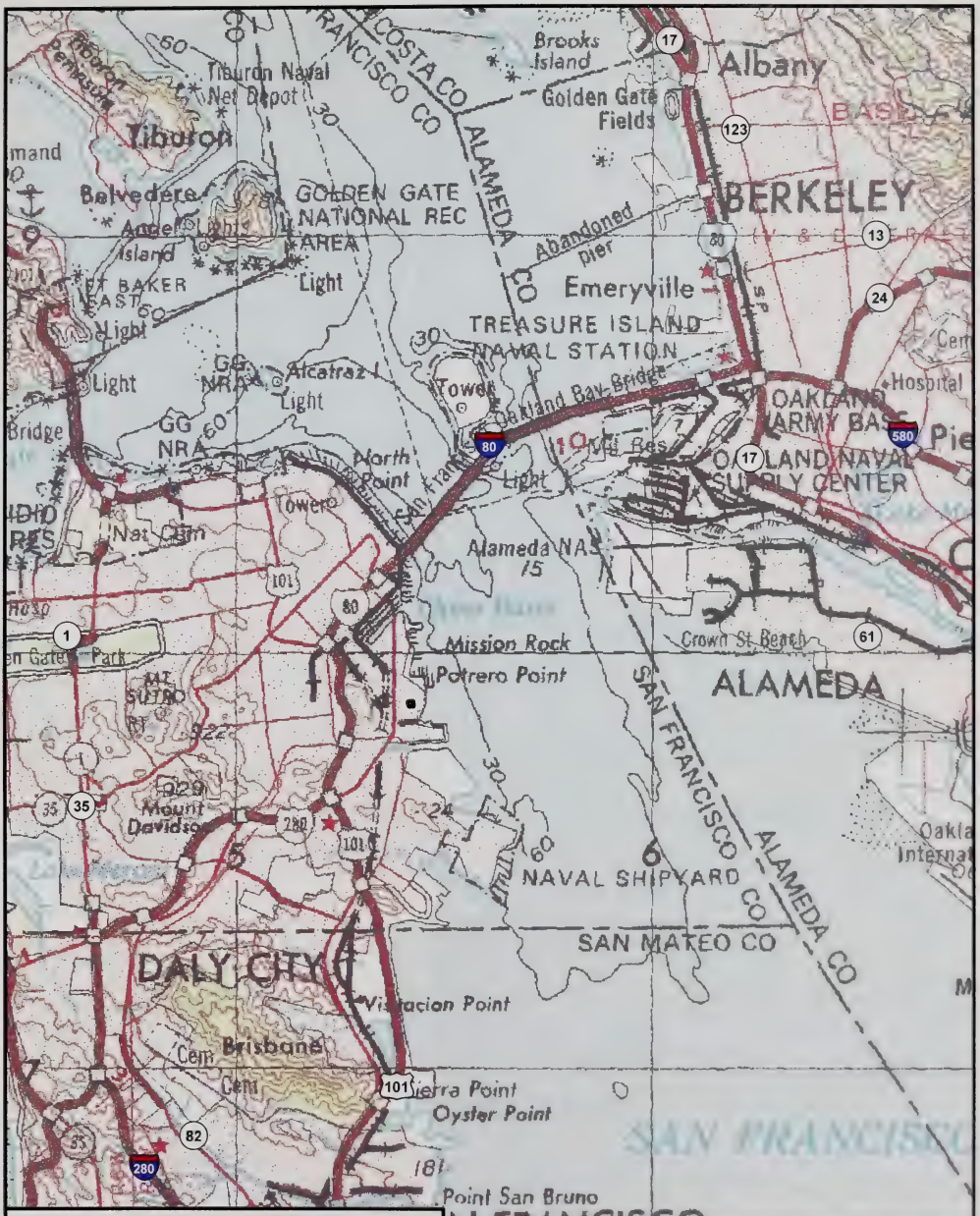


FIGURE 8.10-1
REGIONAL TRANSPORTATION FACILITIES NEAR THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

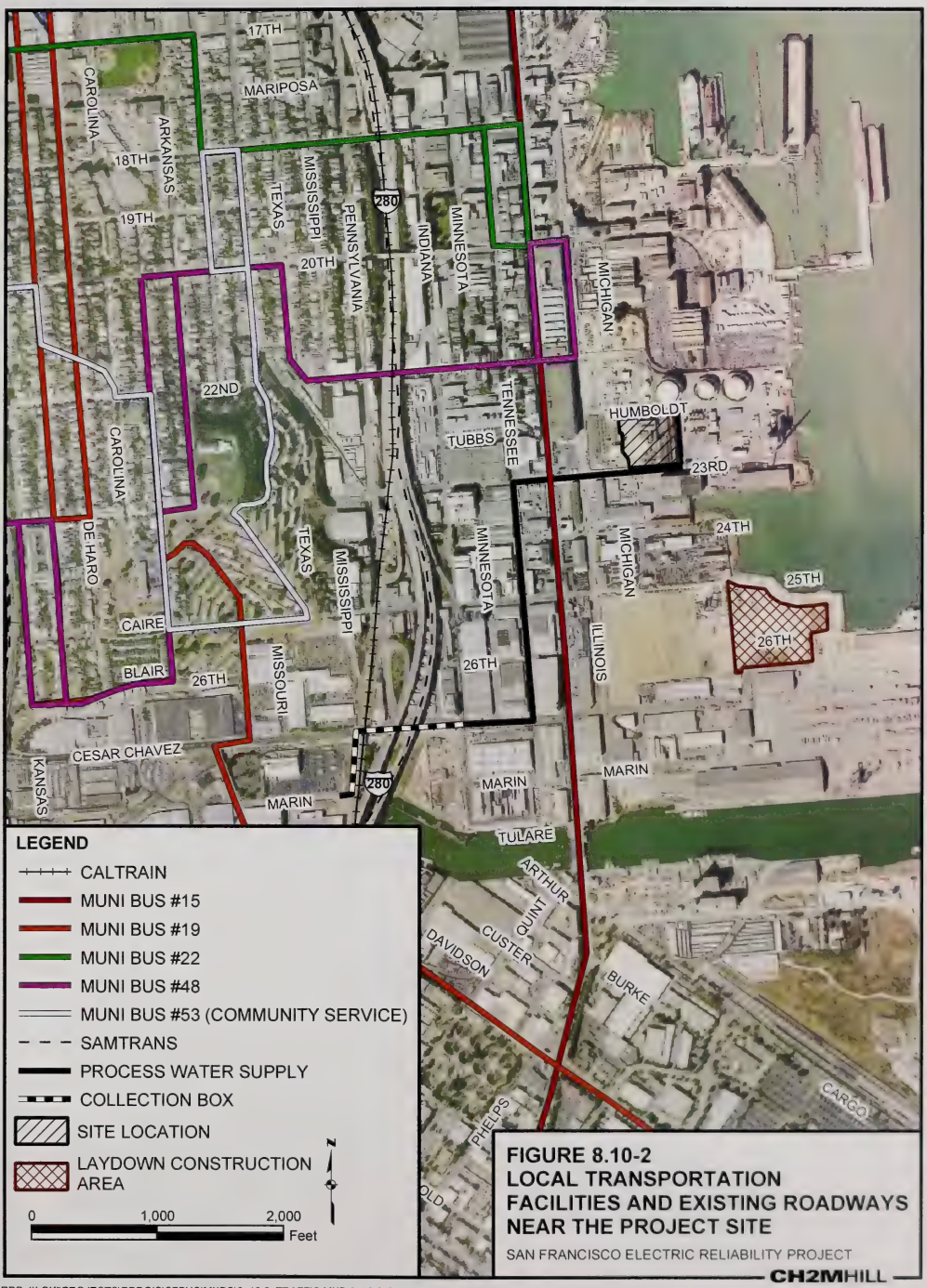


FIGURE 8.10-2
LOCAL TRANSPORTATION FACILITIES AND EXISTING ROADWAYS NEAR THE PROJECT SITE

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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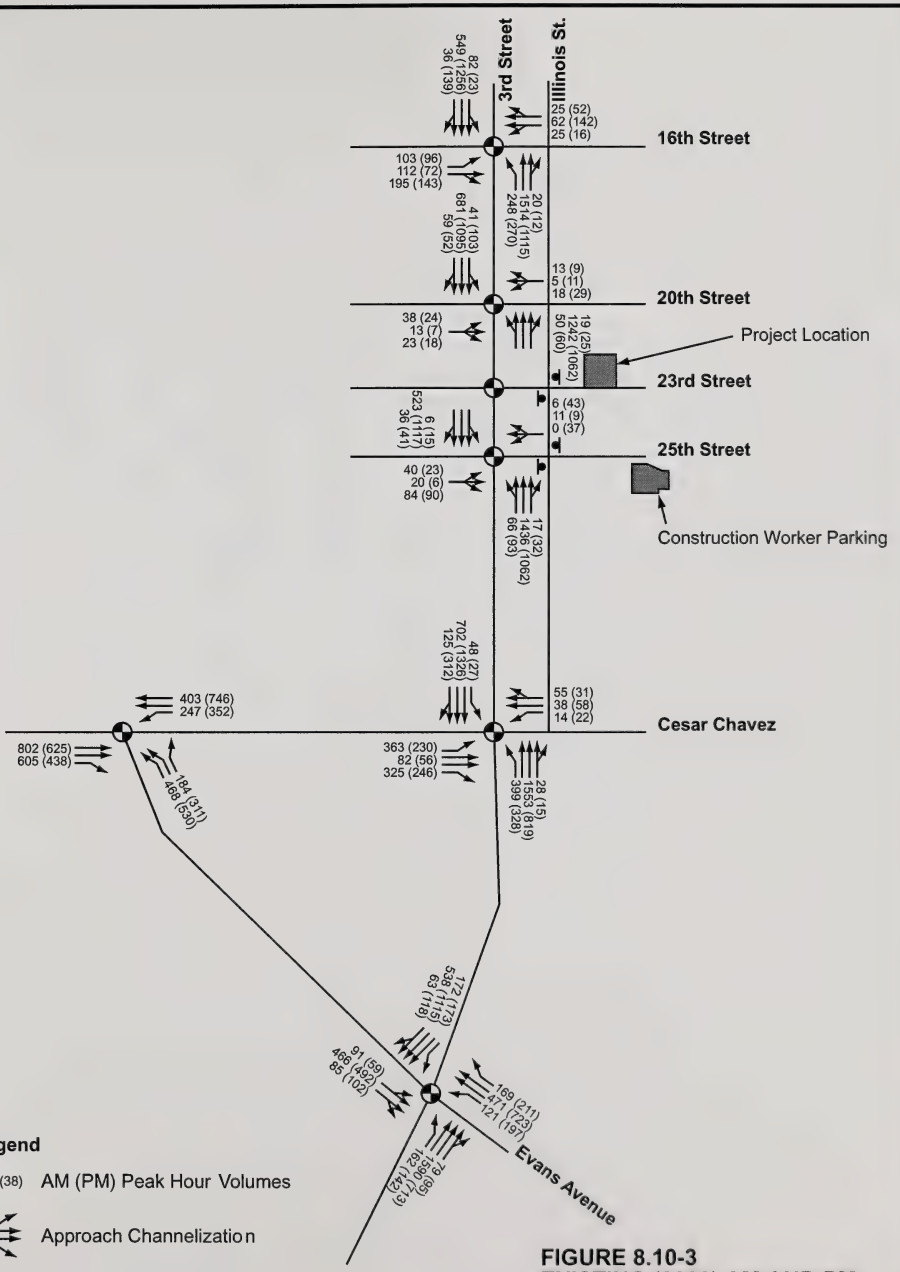


FIGURE 8.10-3
EXISTING (2000) AM AND PM PEAK HOUR VOLUMES, INTERSECTION CHANNELIZATION AND TRAFFIC CONTROL
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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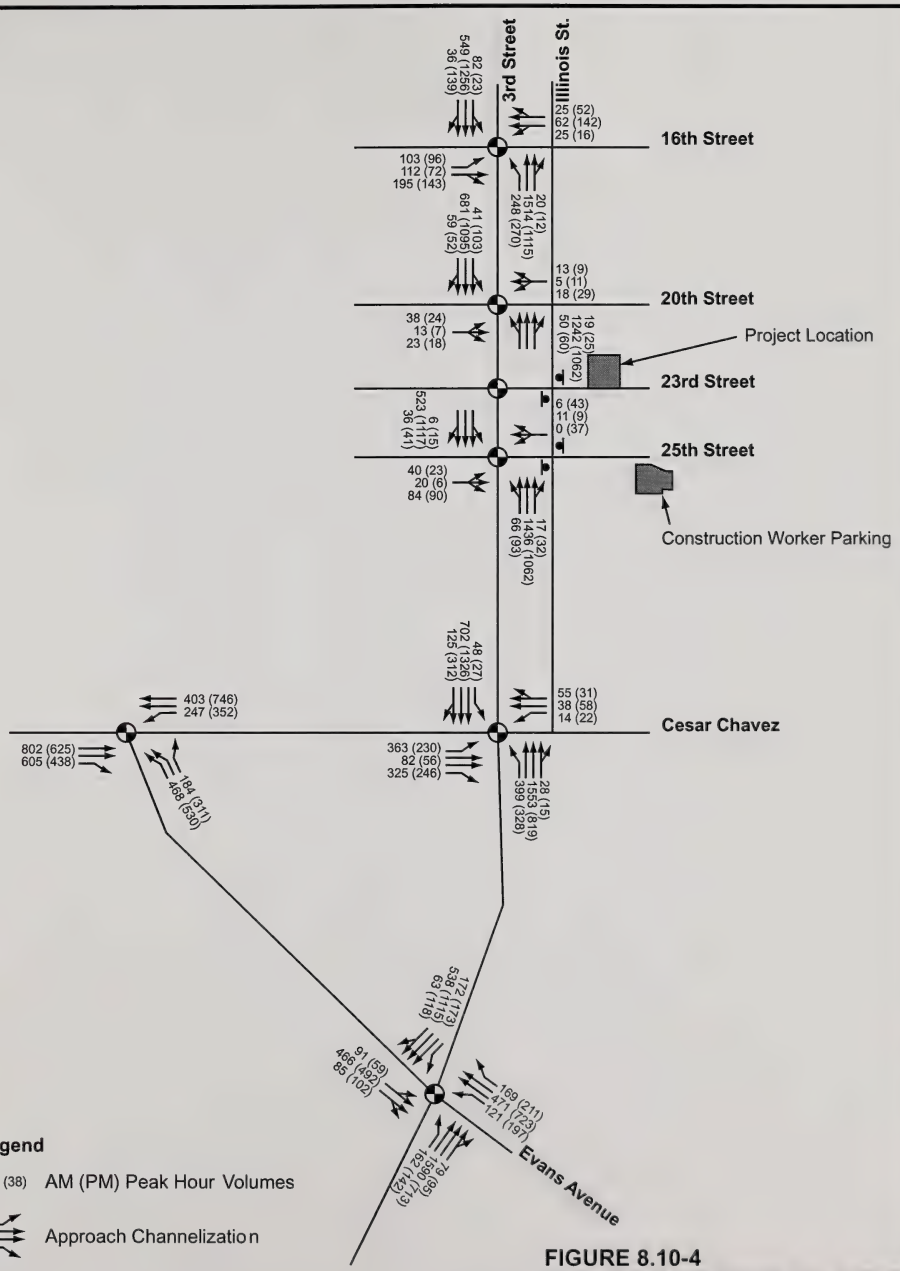


FIGURE 8.10-4
BACKGROUND (2005) AM AND PM PEAK HOUR VOLUMES, INTERSECTION CHANNELIZATION AND TRAFFIC CONTROL
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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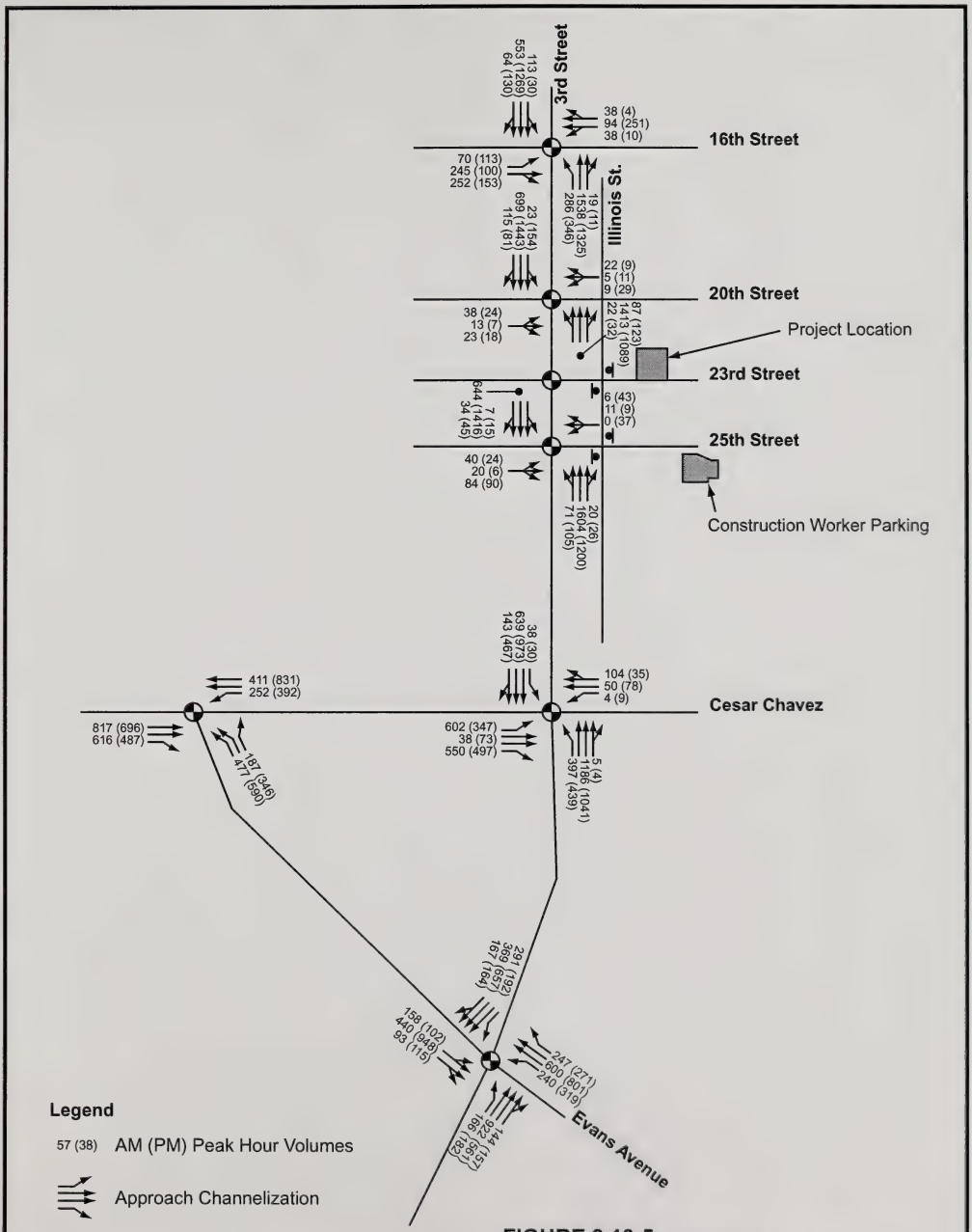
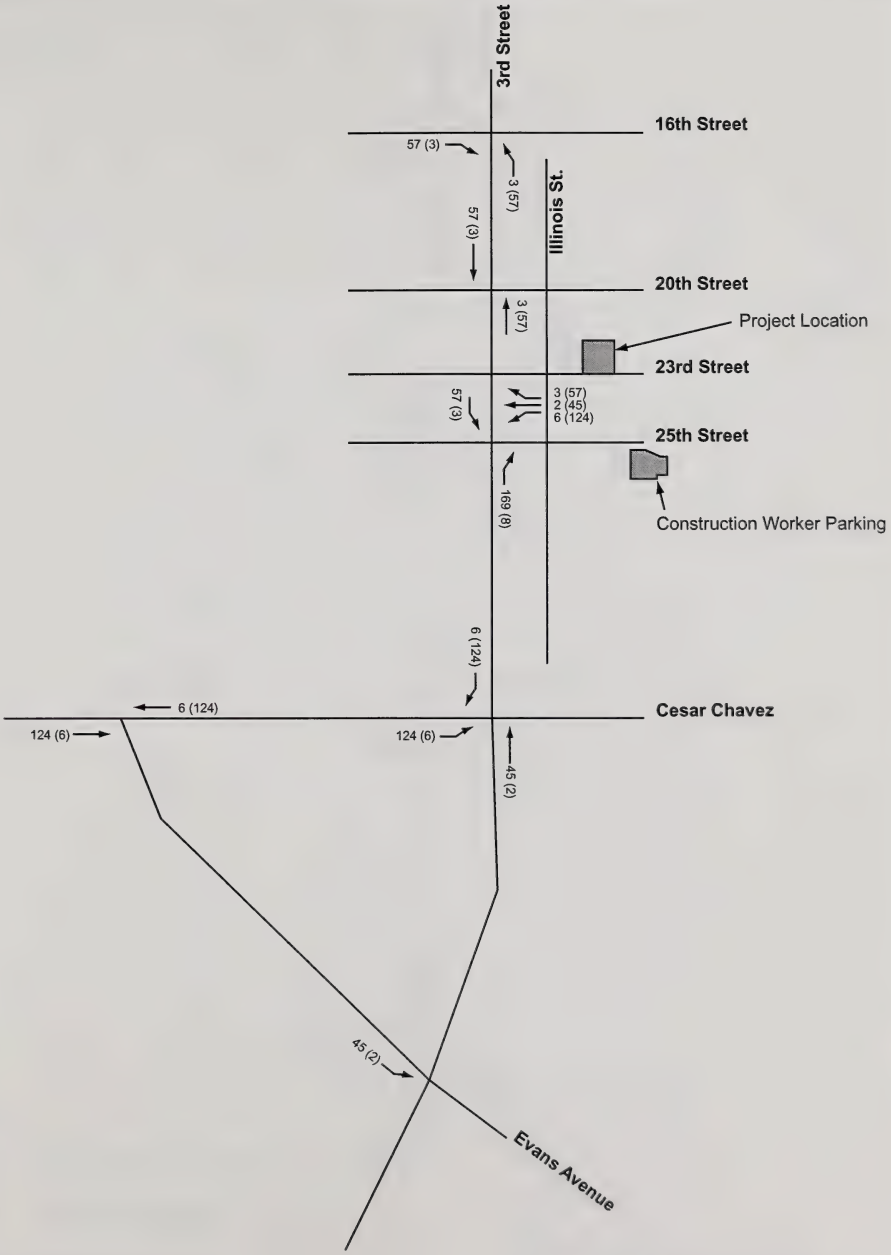


FIGURE 8.10-5
CUMULATIVE (2015) AM AND PM PEAK HOUR VOLUMES, INTERSECTION CHANNELIZATION AND TRAFFIC CONTROL
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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Legend

57 (38) AM (PM) Peak Hour Turn Volumes

FIGURE 8.10-6
PROJECT CONSTRUCTION WORKER AM AND PM PEAK HOUR VOLUMES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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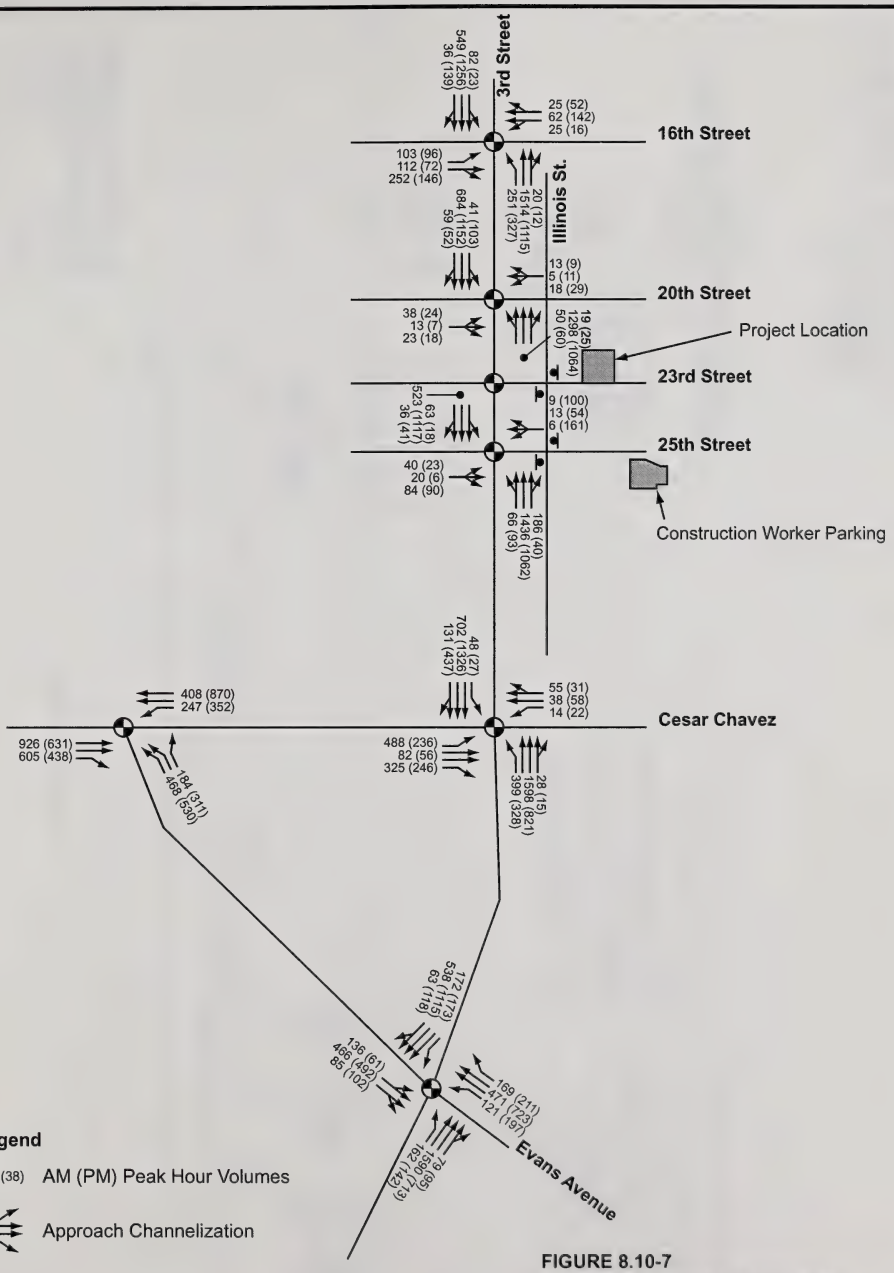


FIGURE 8.10-7
BASELINE (2005) AND PROJECT CONSTRUCTION WORKER AM AND PM PEAK HOUR VOLUMES, INTERSECTION CHANNELIZATION AND TRAFFIC CONTROL
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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DIST	COUNTY	ROUTE	POST MILE	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

July 1, 2002

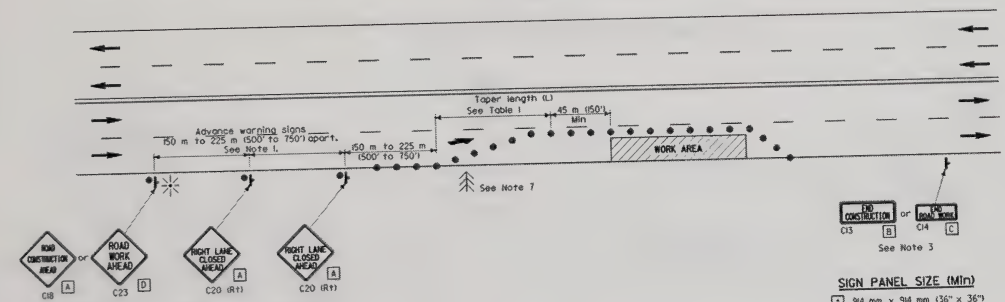
PLANS APPROVAL DATE

Greg W. Edwards C36396 6-30-04 REGISTERED CIVIL ENGINEER

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Caltrans now has a web site! To get to the web site go to: http://www.dot.ca.gov

TYPICAL LANE CLOSURE



SIGN PANEL SIZE (Min)

- A 914 mm x 914 mm (36" x 36")
- B 1219 mm x 457 mm (48" x 18")
- C 914 mm x 457 mm (36" x 18")
- D 762 mm x 762 mm (30" x 30")

LEGEND

- Traffic Cone
- Portable Sign
- Direction of Travel
- Flashing Arrow Sign
- Portable Flashing Beacon

TABLE I

Approach Speed	*Taper Length (L)	*Number of Cones for Taper	Spacing of Cones Along Taper
0-40 km/h (0-25 mph)	18m (25')	6	7.5 m (25')
40-65 km/h (25-40 mph)	98 m (320')	9	12 m (40') ‡
65-80km/h (40-50 mph)	183 m (600')	13	15 m (50') ‡
Over 80 km/h (50 mph)	See Note 9		

* Based on 3.6 (12') wide lane. This column is also appropriate for lane widths Less than 3.6 m (12')

NOTES:

1. Where approach speeds are low, signs may be placed at 90 m (300') spacing, and in urban areas, closer.
2. All advance warning sign installations shall be equipped with flags for daytime closures. Flashing Beacons shall be placed at the locations indicated for nighttime closures.
3. A C13 "END CONSTRUCTION" or C14 "END ROAD WORK" sign, as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious, or ends within a larger project's limits.
4. If the C18 (or C23) sign would follow within 600 m (2000') of a stationary C18, C23, or C11 "STATE HIGHWAY CONSTRUCTION NEXT ___ MILES", use a C20 sign for the first advance warning sign.
5. All cones used for night lane closures shall be fitted with reflective sleeves as specified in the specifications.
6. Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used in lieu of cones for daytime closures only.
7. Flashing arrow sign shall be either Type I or Type II.
8. The maximum spacing between cones in a taper shall be approximately as shown in Table I and 15 m (50') maximum spacing on tangent.
9. For approach speeds over 80 km/h (50 mph), use the "Traffic Control System for Lane Closure On Freeways and Expressways" plan for lane closure details and requirements.
10. Where specified in the special provisions, a W11 "LANE REDUCTION SYMBOL" sign is to be used in place of the C20 "RIGHT LANE CLOSED AHEAD" sign.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

These "Standard Plans for Construction of Local Streets and Roads" contain units in two systems of measurement: International System of Units (SI or "metric") and United States Standard Measures shown in the parentheses (). The measurements expressed in the two systems are not necessarily equal or interchangeable. See the "Foreword" at the beginning of this publication.

NO SCALE

FIGURE 8.10-8
TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS

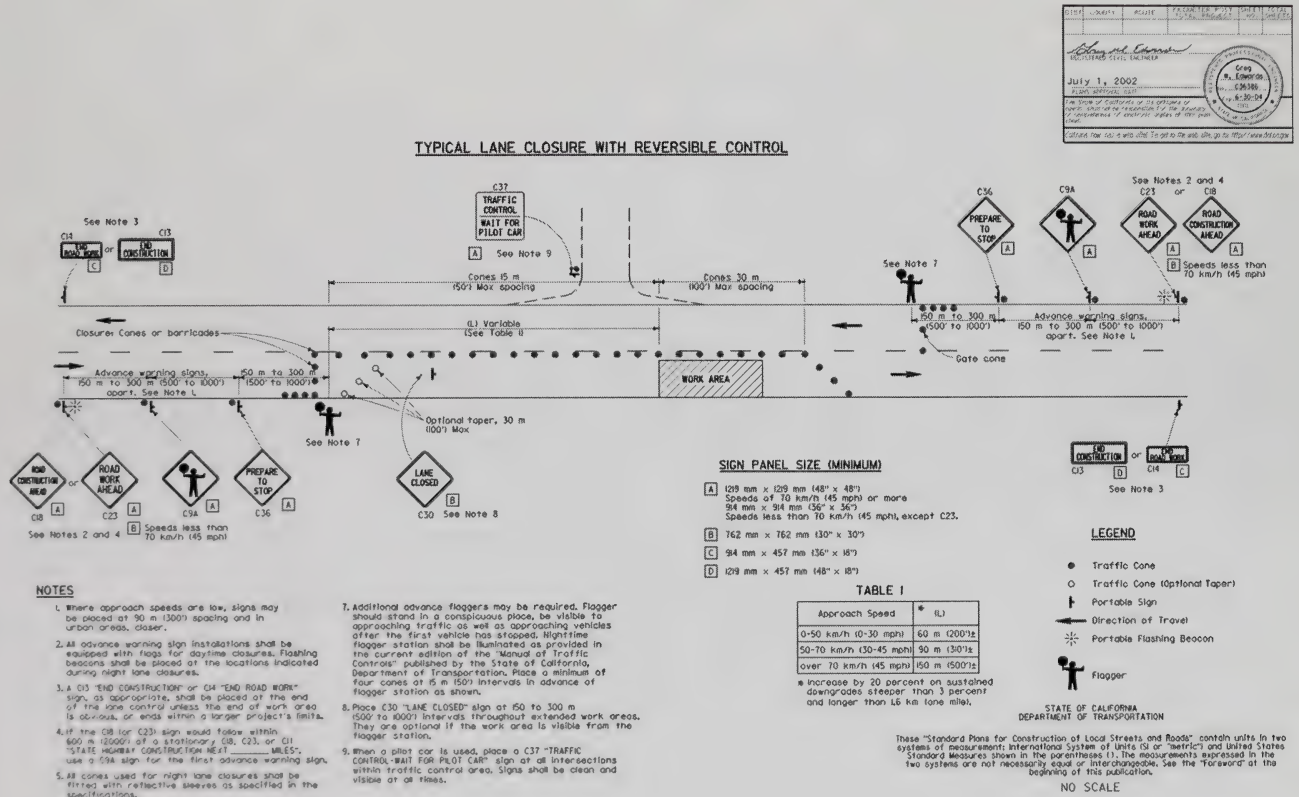


FIGURE 8.10-9
TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON TWO LANE CONVENTIONAL HIGHWAYS

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SUBSECTION 8.11

Visual Resources

8.11 Visual Resources

8.11.1 Introduction

Visual resources are the natural and cultural features of the landscape that can be seen and that contribute to the public's appreciative enjoyment of the environment. Visual resources impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which the project's presence would change the perceived visual character and quality of the environment in which it would be located.

This section discusses the potential for the construction, operation, and maintenance of the proposed project to cause significant impacts to visual resources in the project vicinity.

This section was prepared following the CEC guidelines for preparing visual impact assessments for AFCs. Section 8.11.2 documents the visual conditions that now exist in the project area. Section 8.11.3 describes the changes to the project area's landscape from project implementation. Section 8.11.4 discusses the significance of the potential impacts of the project. Section 8.11.5 discusses the potential cumulative impacts of this and other projects on the visual resources in the area. Section 8.11.6 summarizes the mitigation measures that reduce the project's potential impacts on visual resources to a level of less than significant. Section 8.11.7 identifies the laws, ordinances, regulations, and standards that are applicable to the project. Section 8.11.8 lists the references used in preparation of this section. All figures for this subsection are located at the back.

8.11.2 Affected Environment

8.11.2.1 Regional Setting

Land uses within San Francisco are diverse. The western and northwestern shorelines provide areas for open space and recreation, and the northeastern and eastern shorelines provide opportunities for maritime commercial activities and other waterfront uses. Commercial and residential uses are located throughout the City. Open spaces, such as parks, landscaped areas, or undeveloped natural areas, are also found throughout the City. Major roads and freeways both connect and divide neighborhoods, commercial districts, and industrial areas.

The larger landscape region within which the project is located is the northern San Francisco peninsula. The landscape of this region is characterized by: the open waters of the Pacific Ocean and San Francisco Bay, various types of developed areas including commercial, residential, and industrial structures, local streets and state highways, and open spaces. The Ocean and Bay play important roles in this landscape region in that they are often the focus of views from the hills and shoreline areas, in addition to being places of human activity.

Yerba Buena Island and Treasure Island and the Golden Gate and San Francisco-Oakland Bay bridges crossing the Bay also are distinctive and well-known features. Distance, in combination with haze, smog, or fog often limits visibility from Yerba Buena Island. The project site is visible from the Bay Bridge, but it is a background view (greater than 3 miles), and the bridge structure partially screens views, so onsite features are not clearly discernible. The East Bay hills form the regional backdrop on the eastern side of the Bay.

Views toward the project site are available at public viewpoints, private residences, and parks. The 300-foot-high Unit 3 stack at the Potrero Power Plant is visible from the East Bay, but other distinctive landscape features dominate the views from that area. In addition, the hills within San Francisco to the west of the project site form additional focal features, and may define local neighborhoods. View opportunities toward the project site exist at the higher elevations on the hills, but due to the distance, site features are not clearly evident.

The project site is not clearly visible from ferries, private vessels, or personal watercraft out on the Bay, due to the existing Potrero Power Plant located to the east of the project site and the industrial development located near the shoreline to the north and south of the project site. These existing features all serve to screen the project site from view from the Bay. The view of the site from the water is considered to be from the middleground or background.

Interstate-280 (I-280), located approximately 0.3 mile to the west of the project site, is a major commuter route and entry into the City. Most of the facilities that are currently located at the project site are seen for a relatively short duration when traveling northbound on the freeway. Fewer opportunities to view the site are available when traveling southbound on I-280.

A residential neighborhood exists along Tennessee Street, north of Tubbs Street. These are the closest residences to the project site, and are approximately 600 feet from the site. Views of the site from these residences are mostly screened by a multi-story building located on Third Street between 22nd and 23rd streets, except for the residences on Tennessee Street nearest to Tubbs Street. Those residences would have a view of only the southwestern corner of the project site, partially screened by the existing PG&E switchyard that is located between the residences and the project site.

SBC Park is located approximately 1.5 miles north of the project site in the China Basin area. The higher stands in the Park may afford views to the south toward the project site; however, these views are dominated by the Bay, ball field, and surrounding lights, and are obstructed by the industrial development between the Park and the project site.

The taller structures in the downtown area of the City provide views of parts of the Bayshore, with some southward views toward the project from approximately 2 to 3 miles away. These views are from offices and residences. Although viewers in the downtown area could be focused south frequently and for long periods of time, there are many other manmade structures and natural landscape features in the intervening landscape that draw viewers' attention.

8.11.2.2 Project Vicinity Setting

Photographs were taken in December 2003 to document the character of the landscape in the vicinity of the project site. Figure 8.11-1 is a map of the area that depicts the project site, the relative locations where the photos were taken, and also indicates the direction that the camera was focused for each photo.

Photo LC-1 on Figure 8.11-2 is the view looking south from the Agua Vista Park toward the project site. It is located on Terry A. Francois Boulevard (also known as China Basin Street) approximately 0.65 mile from the site. The park consists of a small area with picnic tables and a public pier. Recreation use at the park does not appear to be high. The San Francisco

General Plan's Recreation and Open Space Element identifies this park for expansion and improvement (CCSF, 1998a). As shown in the photo, views of the site would be partially screened due to the structures in the foreground. The water shown in the photo is part of the Central Basin. The project would be located in the left one-third of the photo near the existing 300-foot-high Potrero Unit 3 stack[1].

Photo LC-2 on Figure 8.11-2 is the view looking southeast toward the project site from the 20th Street overcrossing of I-280. This viewpoint is approximately 0.4 mile from the site. This photo shows the industrial character of the area in which the project site is located. The 300-foot-high Potrero Unit 3 stack is visible toward the left of the photo. This feature serves as a landmark that helps to identify the approximate location of the proposed project features, which would be sited in the area to the right of the stack.

Photo LC-3 on Figure 8.11-3 is the view looking northeast from a multi-story single-family residential building located at 1415 Indiana Street (between 25th and 26th streets). These residences are located approximately 0.3 mile southwest of the project site. There are fewer than 100 residences within this immediate area; the area is predominantly industrial. The photo was taken from the second floor landing of the residential building. Views toward the project site from the lower levels of this building are mostly, if not completely, screened by the industrial buildings located on 25th Street. The 300-foot-high stack, although visible from this location, does not appear out of character due to the other vertical elements in the photo (the several overhead electrical distribution poles) and the industrial character of the area. As demonstrated by the photo, there are no views of the Bay from this level, and therefore, there would be no views of the Bay from street level. Upper levels within this residential development are afforded partially-screened views of the Bay and the project site. Although the foreground context of these views is industrial in character, because of the views of the Bay and the distant East Bay hills, the views from the upper floors of these residences could be considered to be moderately high in visual quality. Views from the lower levels of residences are considered to be of low visual quality because of the dominance of the nearby industrial structures (as shown in the photo).

Photo LC-4 on Figure 8.11-4 is the view at Warm Water Cove Park looking northwest toward the project site. Warm Water Cove Park is located approximately 0.2 mile southeast of the project site. The park has picnic tables, a short trail, a pier, and landscaping that does not appear to be well maintained. The park appears to have a low level of use. The San Francisco General Plan's Recreation and Open Space Element identifies this park for improvement (CCSF, 1998a), and the San Francisco General Plan's Central Waterfront Area Plan identifies this park for improvement and expansion (CCSF, 1998b). The high quality views from the park are those that are oriented toward the Bay. The views in other directions are dominated by industrial structures and disturbed or paved areas. Views toward the site from this park are, to a large degree, screened due to the presence of the large white building visible in the photo. This building is located on the south side of 23rd Street. A small portion of the old red brick structure known as Station A, which occupies a portion of the project site, is visible in the right one-third of the photo. This building would be removed prior to or as part of the project.

[1] The height of the stack is 300 feet. It was built at an elevation of approximately 3 feet mean sea level (msl). Therefore, the top of the stack is approximately at elevation 303 feet.

8.11.2.3 Project Site Setting

The San Francisco Electric Reliability Project (SFERP) is proposed to be developed in an industrial setting near the western shore of San Francisco Bay within the City and County of San Francisco (CCSF) at the location indicated on Figure 8.11-1. The project site consists of an approximately 4.5-acre area that is adjacent to the PG&E Potrero Substation. The area is now occupied by three large red brick buildings, which once housed power generation equipment. Two of these buildings would be removed prior to development of the project at the site. The Potrero Power Plant is located directly east of the site. Potrero Unit 3, which includes a 125-foot-high power plant structure and a 300-foot-high exhaust stack, is a visually prominent landmark in this portion of San Francisco.

Photo LC-5 on Figure 8.11-4 is the view from 23rd Street looking northeast into the project site. The project site is bounded on the north by a paved roadway (Humboldt Street), on the west by PG&E's Potrero Substation, on the east by the existing Potrero Power Plant, and on the south by a paved roadway (23rd Street). The site was previously used for power generation, but currently, the parcel is not being used. There are three brick buildings and one painted corrugated metal building on the parcel. In addition, the paved site is overgrown with tall weedy vegetation. This photo documents the existing condition, character, and visual quality of the site.

To the left of the photograph's center, a small portion of a brick building with a sloped roof is visible. This building (meter house) would be retained and would become the control building for the project. To the right of this building is a brick building (compressor house) that once served as a generator hall. This building would be removed prior to or as part of the project. Behind and to the right of this building is a large structure known as Station A. The walls of this structure are approximately 68 feet high, and the peak of its roof rises to a height of 77 feet.[2] This building would also be removed prior to or as a part of the project. The metal building in the far left foreground of the photo is the PG&E control building for the substation located adjacent to and to the west of the project site. This building would not be affected by the project.

The metal building in the distance in the left one-third of the photo would be removed as part of the project. The 300-foot-high stack at the Potrero Power Plant is visible at the end of 23rd Street at the right side of the photo. The building shown in the far right of the photo is a warehouse and office building located on the south side of 23rd Street. As review of photo LC-5 on Figure 8.11-4 suggests, the site does not contain any features that would be considered to be scenic resources. The visual quality of the site is considered low.

8.11.2.4 Natural Gas Pipeline and Supply Water Pipeline Routes

The proposed underground natural gas pipeline would be 250 feet long. It would provide natural gas to the project site via a connection at the PG&E Potrero Substation to the west and adjacent to the project site. The visual quality of the proposed alignment (project site and adjacent PG&E site) is considered low.

[2] The FSA that was prepared for the proposed Potrero Unit 7 Project erroneously indicates that the Station A structure is 105 feet high. The height figures presented here are based on a review of building drawings, and are consistent with observations of this building in relationship to nearby structures of known heights.

The proposed underground process water pipeline would be approximately one mile long. It would begin at the eastern deadend of Marin Street, be routed north parallel to the railroad tracks, then east on Cesar Chavez Street, north on Tennessee Street, and then east on 23rd Street terminating near the eastern boundary of the project site. The route is shown on Figure 2-1. The area through which this pipeline route would be aligned is a completely developed landscape devoted to urban (industrial, commercial, and a few residences) uses; it has a moderately low-to-low visual quality.

8.11.2.5 Construction Laydown Area

The 10-acre construction laydown area would be located from about 100 feet west of Maryland Street to about 150 east of Massachusetts Street, and between 25th Street and 200 feet north of Cesar Chavez Street (see Figure 2-1). The site is a previously disturbed, relatively flat, vacant parcel of land with a low level of visual quality.

8.11.2.6 Existing Lighting in the Project Area Vicinity

The project site, when viewed at night, nearly fades from view because of the lack of lighting currently at the site. A partial silhouette of the Station A building is visible due to the lighting along 23rd Street and on the adjacent parcels.

Existing visible night lighting in the project vicinity is substantial, ranging from softer amber-colored light to intense white light. Light sources include the nearby commercial buildings, industrial facilities, the existing adjacent Potrero Power Plant (including lights on the 300-foot-high stack and 125-foot-high power plant structure), the adjacent PG&E Substation, shipyards, automobile lights and streetlights on I-280 and nearby city streets, residences, and across the Bay along the shoreline and in the hills. Many of the lights are unshielded or occur in clusters, creating a more prominent visual source of light.

8.11.2.7 Sphere of Influence

The visual sphere of influence (SOI) for the proposed project represents the area from which the project has the potential to be visible. Depending on location, views toward the proposed power generating facility could be blocked by other structures, trees, shrubs, or other features in the viewer's immediate foreground. From some viewpoints, only the tops of the project's taller features will be visible. From other viewpoints, where there are open or partially open views toward the site, the proposed power generating facility has the potential to be more visible.

The boundaries of the SOI (the area of potential visibility around the project) are considered to extend no more than 3 miles from the project site. This is because elements of a view that are 3 miles or more away are considered to be a part of the background, the landscape zone in which little color or texture is apparent, colors blur into values of blue or gray, and individual visual impacts become less apparent (USDA, 1973). In addition, observations of larger combined-cycle power plant projects indicate that after about 2.5 miles, the facility's details become blurred and the facility becomes a relatively small element in the overall landscape, with a very limited level of visual prominence.

The SOI for this project needs to take into account the existing structures in the area, including the existing 300-foot-high Potrero Unit 3 stack located adjacent to the project site on its east side. Figure 8.11-5 shows the 3-mile boundary around the project site. It also

shows the areas where views toward the project site are either partially or fully obstructed due to topographic conditions. It does not take into consideration the screening effects of minor variations in terrain, adjacent development, or vegetation, which would further limit views of the site. Beyond the mapped SOI, the proposed project is not expected to be visible due to screening, or would be of such a small size in the background field of view that significant impacts to visual resources would not be expected.

8.11.2.8 Sensitive Viewing Areas and Key Observation Points

To structure the analysis of the project's effects on visual resources, the view areas that would be the most sensitive to the project's potential visual impacts and the sensitive receptors[3] in those areas were identified. Representative viewpoints from these sensitive receptor locations are referred to as Key Observation Points (KOPs). Two KOPs were selected for detailed analysis for the proposed project. The KOPs were selected based on: (1) their expected unobstructed views of project facilities from those residences, and (2) their being generally representative of views from several residential areas and from I-280 and the Potrero Hill Recreation Center.

Figure 8.11-1 indicates the locations where the two KOP photos were taken and the direction that the camera was focused for each photo. The KOPs "existing view" photos are the "before" views of the project site. As shown, the two areas selected as KOPs lie approximately 0.5 mile from the project site and are, therefore, areas in which project features would be visible in the foreground/middle ground[4].

For each of the KOPs, photo simulations were developed to serve as a basis for visualizing the project's potential effects from representative locations. In evaluating the sensitivity of the viewing areas potentially affected by the project, consideration was given to distance from the project site, numbers of viewers, and the presence of residential or recreational uses. The visual analysis is not based solely on the view from these KOPs.

To respond to the CEC's requirement that an assessment be made of the visual quality of the landscapes potentially affected by the project, the discussion of the views seen from the KOPs includes ratings of the visual quality of the landscapes that they represent. These ratings were developed based on a series of in-field observations carried out in December 2003, review of photos of the affected area, and review of methods for assessment of visual quality. The final assessment of the visual quality of the views from each of the KOPs was made based on professional judgment that considered a broad spectrum of landscape assessment factors. The factors considered included evaluation of:

- Natural features, including topography, water courses, rock outcrops, and natural vegetation
- The positive and negative effects of man-made alterations and built structures on visual quality

[3] Typically, residents and recreationists are considered to be sensitive receptors to changes in the landscape. This is because of the potential for effects to their long-term views or their enjoyment of a particular landscape or activity.

[4] The foreground view zone is generally less than 0.5 mile from the viewer; the middleground view zone is generally 0.5 mile to 3 miles from the viewer.

- Visual composition, including assessment of the complexity and vividness of patterns in the landscape.

The landscape quality ratings expressed as a scale of six landscape quality classes are listed in Table 8.11-1. This rating system is based on the scale developed for use with an artificial intelligence system for evaluation of landscape visual quality developed by a group of landscape scholars at Virginia Tech (Buhyoff et al., 1994). The scale has a common-sense quality and is readily understandable. It defines landscape quality in relative terms, contrasting landscapes that are average in visual quality with those that are above and below average, and those that are at the top and bottom of the landscape quality spectrum.

TABLE 8.11-1
Landscape Visual Quality Scale Used in Rating the Areas Potentially Affected by the Proposed Project

Rating	Explanation
Outstanding Visual Quality	A rating reserved for landscapes with exceptionally high visual quality. These landscapes will be significant regionally and/or nationally. They usually contain exceptional natural or cultural features that contribute to this rating. They will be what we think of as "picture post card" landscapes. People will be attracted to these landscapes to be able to view them.
High Visual Quality	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These are often landscapes which have high potential for recreational activities or in which the visual experience is important.
Moderately High Visual Quality	Landscapes which have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to man-made or natural features contained in the landscape, to the arrangement of spaces, in the landscape, or to the two-dimensional attributes of the landscape.
Moderate Visual Quality	Landscapes which have average scenic value. They usually lack significant man-made or natural features. Their scenic value is primarily a result of the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape.
Moderately Low Visual Quality	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant man-made alterations, but the landscape is not dominated by these features. They often lack spaces that people will perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low Visual Quality	Landscapes with low scenic value. The landscape is often dominated by visually discordant man-made alterations; or they are landscapes that do not include places that people will find inviting and lack interest in terms of two-dimensional visual attributes.

Source: Buhyoff et al., 1994.

The environment surrounding the project site, including the area where the proposed natural gas and process water pipelines, and construction laydown area are located, is a landscape of moderately low-to-low visual quality. It is characterized by developed urban uses that include industrial, port, and power plant facilities located in an industrial setting within the City of San Francisco.

Near the project site, views of the Bay are largely obscured by existing facilities. From higher elevations, such as on Potrero Hill located to the west of the project site approximately 0.5 mile, views of the Bay exist to varying degrees, depending on the height and mass of the structures along the western shore of the Bay. On foggy days, views of the

Bay are obstructed; on clear days, it may be possible to see the East Bay Hills on the east side of the Bay. In addition, the 300-foot-high Potrero Unit 3 stack that is located to the east of the project site (and is used as a landmark in locating the project site in the photos) becomes less visible on foggy days, except for the plume that it emits. On warm, clear days, the Potrero stack typically does not emit a plume.

The KOPs are described below.

8.11.2.8.1 KOP 1 - 20th Street at Mississippi Street. Figure 8.11-6a depicts the view from KOP 1, a residential area on Potrero Hill that is located approximately 0.5 mile northwest of the project site. The photograph was taken from a residence that is located on the northeast corner of Mississippi Street at 20th Street, facing southeast. This view was selected as representative of up to 100 residences on Potrero Hill that would have varying views of the project site, depending on the height and mass of the other intervening residential structures on the hill. This view may also be considered representative of motorists' views while traveling eastbound on 20th Street, when at the higher elevations on the hill, although motorists' views would be fleeting.

The photo shows 20th Street in the immediate foreground, residential structures, and the 300-foot-high stack in the distance to the left of photo center. The upper portions of the brick buildings that are located at the project site (and would be demolished prior to or as part of the project) are visible in this view to the right of the stack.

The sensitivity of this view is considered moderate, and the view from this location can be classified as having moderate visual quality. Although the foreground of the view is developed and includes industrial features, the view's positive attributes include the visual interest that is afforded by the textures and colors of the residential structures in the foreground and the expansive view of the open water of the Bay and of the distant East Bay hills.

8.11.2.8.2 KOP 2 - Missouri Street at Watchman Way. Figure 8.11-7a depicts the view from KOP 2, a residential area located on Potrero Hill immediately east and somewhat downslope of the Potrero Hill Recreation Center. This neighborhood is located approximately 0.5 mile west of the project site. This view was selected as representative of up to 100 residences that are located on the east slope of Potrero Hill. It may also represent the view seen by recreationists at the Potrero Hill Recreation Center, although views to the east from that area are largely screened by the mature vegetation. This location may also represent the fleeting view of passengers in vehicles that are traveling north on I-280 when their view is focused to the east. The elevation of the motorists traveling on I-280 would not be as high as the residences located on Missouri Street at Watchman Way, so passengers' views of the project site are more obstructed than at the residences. As shown in the photo, the urban setting is the dominant theme of the photo. Residences are located in the immediate foreground. I-280 is shown on the right side of the photo, as are electrical distribution conductors and the electrical pole. Industrial development is seen in the photo between the freeway and the edge of the Bay. Existing industrial structures are visible in this view, including the Potrero Unit 3, 125-foot-high power plant building, 300-foot-high stack and the red brick structures on the project site that would be demolished prior to or as part of the project. The project facilities would be located in the general area where these large brick buildings are visible in the photo.

If this view were evaluated only in terms of the industrial development visible in the foreground and middleground, the sensitivity of the view would be considered to be low and the level of visual quality would be considered to be low as well. However, the view also includes an expansive panorama of the Bay and East Bay hills that is visible in the background. Taking the entire view into account, the visual quality of the view is moderately low to moderate, and the level of sensitivity is moderate.

8.11.3 Environmental Consequences

8.11.3.1 Proposed Project Appearance

8.11.3.1.1 Generating Facility, Supply Water Treatment Plant, Switchyard, Transmission Lines, and Natural Gas Metering Station Site. The proposed natural gas-fired generating facility, process water treatment plant, switchyard, transmission lines, and natural gas metering station are described in detail in Chapter 2.0, Project Description. Figure 2-2 shows the layout of the proposed project features on the site, and Figure 2-3 provides typical elevation views. Table 8.11-2 summarizes the dimensions of the generating facility's major features.

TABLE 8.11-2
Approximate Dimensions of the Major Project Features

Feature	Height (feet)	Length (feet)	Width (feet)	Diameter (feet)
Combustion Turbine Generators (CTGs)				
Combustion turbines & generators (base unit)	14.5	56.5	13.5	—
Inlet air filters	12	33	37	—
SCR casings	33	60	25	—
CTG exhaust stacks	85	—	—	12
Chiller cooling tower	45	48	38.5	—
Tanks				
Deionized (DI) water storage tank	32	—	—	42
Treated water storage tank	32	—	—	60
Aqueous ammonia storage tank	—	30	—	8
Service building	21	186	75	—
Electric building	21	100	42	—
Administration/control building	28	92	44	—

The proposed features would change the existing landscape from a site that is paved and includes two very large and one smaller red brick buildings, one metal building, and tall weedy vegetation to a paved site with four buildings (one brick, and three that would be a combination of wood and metal), electrical and gas metering equipment, and an onsite road. Three 85-foot-tall stacks would be the tallest project features at the site. They would appear to be considerably shorter than the Potrero Unit 3 power plant building and one-third the

height of the Potrero Unit 3 stack.[5] The exteriors of all project elements would be treated with a neutral gray finish that would optimize visual integration with the surrounding environment. The exception is the one existing onsite brick building that would be retained and rehabilitated, and would continue to exhibit the red brick texture. With project implementation, much more of the site would be occupied with equipment than is currently the case, and the site, when viewed from adjacent parcels, would appear more orderly and maintained than it does now.

Two overhead 115 kV electric transmission lines would originate at the proposed switchyard (located in the western portion of the project site) connecting to the existing PG&E switchyard that abuts the western boundary of the project site. The proposed transmission line would be routed north approximately 140 feet within the PG&E switchyard site, and would connect to existing electric bays. Two new towers, a turning tower, and dead-end structures would be added to the PG&E switchyard on the north side of Humboldt Street. The new transmission lines would connect to the existing switchyard dead-end structure from the new turning tower. The existing turning towers that serve the Potrero Power Plant would be removed. The entire length of the proposed transmission lines, from the proposed switchyard to the dead-end structure at the existing PG&E switchyard is less than 300 feet. The proposed replacement steel monopoles would be approximately 40 to 50 feet tall (approximately the same as the existing steel lattice towers), but would appear less bulky than the existing towers. It is expected that the casual viewer would not notice this proposed transmission system change at the adjacent site.

Site ingress and egress during project operation would be from a proposed gated entrance on 23rd Street. A facility sign would be posted at the entrance. No landscaping is proposed as part of the project. A 12-foot-high sound wall would be installed around the proposed natural gas fuel system to be located in the southwest corner of the project site. The wall would be given a dull, neutral finish to minimize its visual contrast with its surroundings. In addition, an 8-foot-high chain link fence with a dulled finish and an additional 2 feet of barbed or razor wire would be installed around the project site perimeter. Depending on the distance and elevation of the viewer to the project site, the chain link fence may partially screen views of onsite electrical equipment. Views from the west may also be partially screened by the existing PG&E switchyard that is adjacent to the west side of the project site.

8.11.3.1.2 Natural Gas Pipeline and Process Water Pipeline. The proposed 12-inch-diameter underground natural gas pipeline would be 250 feet long. It would connect to the PG&E system located on the western portion of the PG&E Potrero switchyard site (adjacent to the project site). The only aboveground evidence associated with the natural gas line would be the natural gas metering station to be located in the southwest corner of the project site.

Construction of the proposed natural gas pipeline would occur in non-native soils that have been previously disturbed onsite and at the PG&E switchyard site. Noticeable visual effects associated with this pipeline would be restricted to the project construction phase. During construction of this pipeline, the ground surface of the area along the alignment would be temporarily disrupted by construction fencing and equipment; excavated piles of dirt, concrete, and pavement; and construction personnel and vehicles. These effects would be

[5] The top of the existing Potrero stack is at elevation 303 feet. The tops of the three proposed stacks would be at approximately elevation 111 feet (85-foot-tall stacks constructed on land that is approximately elevation 26 feet msl).

minor and temporary, lasting no longer than 14 months (for both the demolition, if applicable, and construction phases of the project), and would not extend beyond the two sites' boundaries. This underground pipeline would not be a source of substantial long-term change to the visual environment due to the restoration of the ground surface along the alignment as the project construction nears completion.

The project includes a connection to the City's combined sewer system at a collection station near the eastern deadend of Marin Street. The proposed diversion/control structure, pipeline, pump station, and ancillary equipment that would provide process water for the water treatment plant at the project site would be installed underground. The mile-long pipeline route would begin at the eastern dead-end of Marin Street, be aligned north parallel to the railroad tracks, then east on Cesar Chavez Street, north on Tennessee Street, and east on 23rd Street to near the eastern boundary of the project site (see Figure 2-1).

Construction of the proposed diversion/control structure, pipeline, pumps, and ancillary equipment associated with the process water pipeline would take place in non-native soils that have been previously disturbed during the construction and maintenance of the City combined sewer system. Noticeable visual effects associated with the diversion/control structure, pipeline, pumps, and ancillary equipment would be restricted to the project construction phase. During construction of these facilities, the ground surface of the area along the proposed alignment would be temporarily disrupted by construction fencing and equipment; excavated piles of dirt, concrete, pavement, and engineered cover; and construction personnel and vehicles. These effects would be minor and temporary, lasting approximately 4 months, and would not extend beyond the alignment disturbance area. Because the system would be located underground, and the ground surface would be restored as part of the project construction, these project features would not be a source of substantial long-term changes to the visual environment.

8.11.3.1.3 Construction Laydown Area. During the project demolition and construction period, the appearance of the project construction laydown area would change from that of a vacant, previously disturbed and graded parcel to a parcel occupied by construction materials and equipment. Materials delivery trucks and construction personnel would periodically enter and exit the site. A wood-slatted temporary cyclone fence would enclose the site. These visual changes would be substantial when compared to what currently exists on the site; however, they would be temporary and would not create an adverse long-term visual effect.

8.11.3.1.4 Lighting. Although the proposed power plant is a peaking unit, it could be operated 24 hours per day, 7 days per week for periods of time. Its operation would require onsite nighttime lighting for safety and security. To reduce offsite lighting impacts, lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed onsite so that significant light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. For areas where lighting is not required for normal operation, safety, or security, switched lighting circuits would be provided, thus allowing these areas to remain unilluminated (dark) at most times, minimizing the amount of lighting potentially visible offsite.

Project construction activities are planned to occur between 7:00 a.m. and 8:00 p.m. on Monday through Friday. In the event that nighttime construction or demolition activities become necessary, illumination that meets San Francisco, state, and federal worker safety regulations would be required during the demolition and construction periods. To the extent possible, the nighttime lighting would be erected pointing toward the center of the site where activities are occurring, and would be shielded. Task-specific lighting would be used to the extent practical while complying with worker safety regulations.

8.11.3.1.5 Water Vapor Plumes. Experience with plants of this type has demonstrated that the high velocity and temperature of the stack exhaust result in a quick dispersion of stack plumes, minimizing the probability that a visible plume would be created above the stacks. Based on previous experience with these kinds of systems, it is likely that formation of visible plumes from the project would be a rare occurrence related to unusual combinations of cold and damp conditions, and that when present, the plumes would be relatively small. If fog is present, plumes may or may not be discernible in the fog.

The combustion turbines would be equipped with a small cooling tower that is designed to cool the turbine's intake air. The amount of heat that each cooling tower has to remove from the intake air is small, therefore, the volume of water vapor that emanates from a single-cycle cooling tower would be small. This would cause the frequency and size of any water vapor plumes that might be associated with the proposed cooling towers to be limited.

Sensitive receptors (residents and recreationists) in the vicinity of the project site are accustomed to seeing plumes being emitted from the existing 300-foot-high stack located on the parcel adjacent to the project site. Plumes, if they do occur at the proposed plant, would not be substantial in size, and would not be out of character with the surrounding landscape because of the industrial nature of the area, the presence of the plume from the stack on the adjacent site, and the height of other structures in the area. To the extent that they would be emitted, the plumes that would be associated with the proposed plant would not substantially detract from views of the area or the Bay.

8.11.3.2 Analysis Procedure

This analysis of the visual effects of changes that might be brought about by the project is based on field observations and review of the following information: local planning documents, project maps and drawings, photographs of the project area, computer-generated visual simulations from each of the KOPs, and research on design measures for integrating electric facilities into their environmental settings.

Site reconnaissance was conducted to view the site and surrounding area, to identify potential KOPs, and to take representative photographs of existing visual conditions. A single-lens reflex (SLR) 35-mm camera with a 50-mm lens (view angle 40 degrees) was used to shoot site photographs.

Page-size photographs of views toward the project site from each KOP are provided to represent the "before" conditions from each KOP. Visual simulations of the same views toward the project were produced to illustrate the "after" visual conditions. The simulated images represent the project's appearance immediately after completion of its construction. The computer-generated simulations are the result of an objective analytical and computer modeling process described briefly below. The images are accurate within the constraints of

the available site and project data. This method provides the viewer with a clear image of the location, scale, and visual appearance of the proposed project.

Computer modeling and rendering techniques were used to produce the simulated images of the views of the site as they would appear after development of the project. Existing topographic and site data provided the basis for developing an initial digital model. The project engineers provided site plans, elevation plans, and digital data for the project. These were used to create three-dimensional (3-D) digital models of the proposed facilities.

For each KOP, the viewer location was digitized from topographic maps and scaled aerial photos, using 5.5 feet as the assumed eye level. Computer "wire frame" perspective plots were then overlaid on the photographs of the views from the KOPs to verify scale and viewpoint location. Digital visual simulation images were produced as a next step based on computer renderings of the 3-D model combined with high-resolution digital versions of base photographs. The final "hardcopy" visual simulation images that appear in this document were produced from the digital image files using a color printer.

8.11.3.3 Impact Evaluation Criteria

Analysis of the project's impacts was based on an evaluation of the changes to the existing visual resources that would result from construction and operation of the project. An important aspect of this analysis was evaluation of the "after" views provided by the computer-generated visual simulations, and their comparison to the existing visual environment. In making a determination of the extent and implications of the visual changes, consideration was given to:

- The specific changes in the affected visual environment's composition, character, and any specially valued qualities
- The affected visual environment's context
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration
- The numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the likely changes

Significance criteria for impacts to aesthetic resources were developed from the CEQA Guidelines and the CEQA Checklist to evaluate the potential environmental impacts resulting from the project. The following criteria were applied:

- Would the project have a substantial adverse effect on a scenic vista?
- Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
- Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
- Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

8.11.3.4 Assessment of Visual Effects

8.11.3.4.1 KOP 1 – 20th Street at Mississippi Street. Figure 8.11-6b is a simulated view of the project as it would appear from KOP 1. In this photo, construction of the proposed power generating facility would place the facility on the landscape between the viewer and the existing 300-foot-high stack. Due to intervening structures, the only visible elements of the project would be the top portions of the three combustion turbine generator stacks. As is visible in the simulation, the three stacks would appear only a fraction as tall as the existing Unit #3 stack located on the parcel adjacent to and east of the project site. Comparison of the existing view (Figure 8.11-6a) with the simulated view with the project (Figure 8.11-6b) indicates that the stacks would be only slightly taller than the peak of the roofline of the Station A building that would be removed and that removal of this structure and the former generator structure would open up the view of the Bay somewhat from this viewpoint.

Adding the power generating facility would not change the view substantially because, as shown in Figure 8.11-6a, the view already includes several tall industrial-type structures. The Bay is a scenic vista with a unique landscape, but the addition of the three stacks to the view would not detract from or degrade that view. With the project, slightly more water would be visible. Further, the addition of the power-generating facility to the view would not change the KOP's moderate visual quality rating.

Due to the moderate visual sensitivity of this view and its overall moderate visual quality, the project's impact on this view will be noticeable, but would be less than significant.

8.11.3.4.2 KOP 2 – Missouri Street at Watchman Way. Figure 8.11-7b is a simulated view of the project as it would appear from KOP 2. As shown, constructing the proposed power generating facility would add the facility between the existing PG&E switchyard and the existing Potrero Power Plant and its 300-foot-high stack. Facilities at the Potrero Power Plant that were screened by the large brick buildings at the project site would be more visible with project implementation due to the removal of the large structures at the project site. With the project, slightly more water would also be visible due to the removal of those two buildings.

The presence of the project would slightly alter the view seen from vehicles traveling north on I-280. However, vehicles traveling on I-280 would have only a fleeting view of the project facilities due to the speed being traveled and the main focus of the driver being on the roadway and traffic conditions. As shown in Figure 8.11-7a, the area where the project would be located is an entirely man-made environment. Implementation of the project would open up the view of the scenic Bay and the Potrero Power Plant somewhat by removal of the large brick buildings at the project site. In addition, the presence of the proposed project in this view would not change the KOP's moderately low to moderate visual quality rating.

Due to the moderate visual sensitivity of this view and its overall moderately low to moderate visual quality, the project's impact on this view would be noticeable, but would be less than significant.

8.11.3.4.3 Light and Glare. The project's effects on visual conditions during hours of darkness would be very limited. As indicated in Section 8.11.3.1.4, some night lighting would be required for operational safety and security. There would be additional visible lighting associated with the project stacks, switchyard, and open site areas. High illumination areas

not occupied on a regular basis would be provided with switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting would not be highly visible offsite and would not produce offsite glare effects. The offsite visibility and potential glare of the lighting would be restricted by specification of non-glare fixtures and placement of lights to direct illumination into only those areas where it is needed. With implementation of the project, the overall change in ambient lighting conditions at the project site, as viewed from the KOPs and other nearby locations, would not be substantial.

Lighting that might be installed to facilitate nighttime construction activities would, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction lighting would be used to the extent practical while complying with worker safety regulations.

8.11.3.4.4 Water Vapor Plumes. Plumes from project operation during either the daytime or nighttime hours would not be a major visual concern. As indicated in Subsection 8.11.3.1.5, plumes if they were to form during project operation, would be relatively small. During the nighttime, plumes would be visible only if there were sufficient natural or artificial light. Because of the measures that would be taken to reduce project lighting at the plant, plumes that would be present during nighttime hours are not expected to be highly visible.

It should be noted that, because the conditions under which the plumes are likely to form are also conditions under which fog and rain are likely to be present, some of the time that plumes are present, they may not be visible because of the fog and rain. An additional variable that needs to be considered in evaluating the visual implications of the project's water vapor plumes is that many of the daylight, non-fog, non-rain hours when plumes are present would occur during the winter at times when the sky is overcast. During overcast conditions, the contrast of the plumes with the sky would be low, and because of the low degree of contrast, the visual prominence of the plumes would be substantially reduced.

Although the plumes, if present, would be small, during non-fog, non-rain daylight hours, they would have the potential to be seen in the project vicinity. Their visual prominence would be greatest in the foreground zone (up to 0.5 mile from the project site). A contextual factor that needs to be considered in evaluating the visual implications of the project's plumes is that much of the nearby area is devoted to industrial land uses, and the existing Potrero stack on the site that is adjacent to the project is already a source of visible plumes.

8.11.3.4.5 Construction Period Impacts. Construction laydown and parking areas would be within an approximate 10-acre area located southeast of the project site a few blocks (Figure 2-1 in Section 2, Project Description). The laydown area would be located from about 100 feet west of Maryland Street to about 150 east of Massachusetts Street, and between 25th Street and 200 feet north of Cesar Chavez Street (see Figure 2-1).

The parked vehicles, equipment, and stored materials in the construction laydown area would be visible from the eastern ends of 25th Street and Cesar Chavez Street. Although the vehicles, equipment, and stored materials in the laydown area would likely be somewhat visible (because a wood-slatted temporary cyclone fence would enclose the site), and would change the appearance of the site to some degree during the construction period, given the industrial character of the area, it would not substantially reduce the site's visual quality.

After development of the generating facility's structures is completed, all traces of the laydown area would be removed and the surface of the laydown area would be restored to existing conditions.

Construction access to the project site would generally be from Illinois Street to Humboldt Street (to access the north side of the site), and from Illinois Street to 23rd Street (to access the south side of the site). Materials and equipment delivery are expected to be by truck.

As detailed in Section 8.8.4.3, demolition activities at the project site may occur as part of the project over a 3-month period, beginning in the second quarter of 2005, unless the buildings are demolished before commencement of the project. Construction of the project from site preparation and grading to commercial operation is expected to take approximately 12 to 14 months, with commercial operation expected to commence in the second quarter of 2006. During the demolition, if applicable, and construction periods, it is expected that cranes, heavy equipment, and construction personnel would be at the project site. If demolition is part of the project, dust and piles of rubble from the demolished buildings would be visible until they are transported offsite. These activities and the presence of construction equipment and personnel, materials, and piles of rubble would temporarily change the landscape at the site.

8.11.4 Impact Significance

A discussion regarding whether the visual effects of the project would be significant pursuant to CEQA is provided below. The assessment of these impacts has been structured by applying the criteria set forth in Appendix G of the State CEQA Guidelines. The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including objects of historic or aesthetic significance (14 CCR 15382)." The four questions related to aesthetics that are posed for lead agencies and the answers to them are:

1. Would the project have a substantial adverse effect on a scenic vista?

 No. There are no designated scenic roads or vista points in the project viewshed. Although I-280 in the project vicinity is considered eligible for inclusion in the California Scenic Highway Program, it has not been designated, so no scenic quality protection is afforded. Implementation of the project would not result in significant adverse effects on views of the Bay from this freeway, as suggested by Figure 8.11-7b. As the analysis of the views from the KOPs has established, the project would not affect any landscapes of more than moderate visual quality, and any effects to the existing visual quality of landscapes in the area would not be substantial.

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

 No. This question does not apply to the proposed project because none of the project facilities fall within the boundaries of a state scenic highway.

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

 No. The site itself is a flat parcel in an area that is devoted entirely to heavy industry and port uses. An important visual resource in the area is the Bay and East Bay hills, as viewed from San Francisco. Project implementation would not result in significant adverse impacts to those views, and in fact, the view would open up somewhat due to the removal of two of the existing onsite brick buildings. Although the presence of the project would change the character of nearby views toward the site to a small degree, there would be no change in the visual quality of the views. Although the views toward the site would be changed, they would not be changed in a way that could be construed as being substantially degraded.

 Visible project plumes, if they were to occur, would be relatively small, and would not substantially degrade the existing visual character of the site and its surroundings. This is because the general landscape setting of the project is one in which industrial facilities and visible plumes are already present.

4. Would the project create a new source of substantial light and glare that would adversely affect day or nighttime views in the area?

 No. As described in Section 8.11.3.1.4, project light fixtures would be restricted to areas required for safety, security, and operations. Lighting would be directed onsite; it would be shielded from public view, and non-glare fixtures and use of switches, sensors, and timers to minimize the time that lights not needed for safety and security are on would be specified. These measures would substantially reduce the offsite visibility of project lighting.

 Any lighting that might be installed to facilitate nighttime construction activities would, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction lighting would be used to the extent practical while complying with worker safety regulations. With these measures, lighting associated with the project construction and operation would not pose a hazard or adversely affect day or nighttime views toward the site.

8.11.5 Cumulative Impacts

The area in which the project site is located is an area that is developed with industrial and port land uses. The City indicates in its land use plans its intention to fully develop the shoreline area; many new developments are currently planned along the San Francisco waterfront from Fisherman's Wharf to China Basin. The planned projects include a new theme park at Fisherman's Wharf, a hotel at the Embarcadero, restaurants at Rincon Park, a new public boat launch, mixed-use development at Pier 70, and additional housing units in the Central Waterfront area. In addition, the City is currently constructing a light rail extension down Third Street; construction of that project would be complete before the proposed project would be licensed. Each of these projects would contribute to a change in the landscape character of the area.

The proposed project would change the landscape at the project site. It would result in the demolition of two of the onsite brick buildings, either prior to or as part of the project and the development of the site into a generating facility. These changes would result in the site appearing more developed and orderly. However, the development of the proposed project would not result in a significant adverse contribution to cumulative visual impacts on the landscape of the area. This is because the proposed facilities would be sited in an area designated and planned for industrial development and the adjacent sites are already developed into power generation and transmission facilities. The proposed facilities would be in character with the surrounding landscape.

8.11.6 Mitigation Measures

8.11.6.1 Natural Gas Pipeline and Process Water Pipeline

The following mitigation measures have been included as part of the project proposal to reduce the visual impacts of the proposed pipelines:

- After construction, ground surfaces would be restored to their original condition, and any vegetation that had been removed during the construction process would be replaced with like-kind vegetation.

8.11.6.2 Light and Glare

The following mitigation measures have been included as part of the project proposal to reduce the visible changes to ambient lighting and from glare from project facilities proposed at the project site:

- Provide lighting that does not exceed the intensity of (and would be similar in appearance to) the existing levels of night lighting at the adjacent power plant site.
- Minimization of lighting to areas required for safety, security, or operations, and shielding of lighting from public view to the extent possible. Timers and sensors will be used to minimize the time that lights are on in areas where lighting is not normally needed for safety, security, or operation.
- Direction and shielding of lighting to reduce light scatter and glare. Highly directional light fixtures will be used.
- Provide lighting that is consistent with the color of lighting used at the adjacent power plant site.
- Use flashing, red warning lights on project structures only where required.
- Use of minimal signage, and construction of project signs using non-glare materials and unobtrusive colors, in accordance with the San Francisco Planning Code. The design of any signs required by safety regulations will need to conform to the criteria established by those regulations.
- Specification of neutral gray matte finish on project facilities, to the extent it is standard for the industry.
- Specification of dulled gray finish on the site perimeter fencing.

- Specification of dulled and neutral finish on the sound wall to be constructed at the project site.

8.11.6.3 Transmission Lines

The following mitigation measures for the transmission lines have been included in the project design:

- The poles will be constructed of wood or steel to create a trim profile that will coordinate with the existing facilities at the PG&E switchyard.
- The poles will be treated, as necessary, to maximize their visual integration into the backdrop.
- Non-specular conductors will be used.
- Insulators will be non-reflective and non-refractive.

8.11.7 Laws, Ordinances, Regulations, and Standards

8.11.7.1 Introduction

This section describes the LORS relevant to the visual resource issues associated with the project. No federal visual resource laws, ordinances, regulations, or standards exist. However, visual resource and urban design policies applicable to the project are addressed in the San Francisco General Plan, Zoning Map, and Planning Code, and its resolutions and ordinances.

Because the of the project site's proximity to I-280, the California Department of Transportation's (Caltrans') Scenic Highways Program was reviewed. Due to the local importance of the 49-Mile Scenic Drive, it is also discussed in this section.

Table 8.11-3 lists the San Francisco plans and the Caltrans' provisions that are pertinent to the project and visual resources. The specific provisions that have potential relevance to the project and visual resources are identified in Sections 8.11.7.2 through 8.11.7.4.

TABLE 8.11-3
Laws, Ordinances, Regulations, and Standards Applicable to San Francisco Electric Reliability Project Visual Resources

LORS	Purpose	AFC Section Explaining Conformance	Agency Contact
San Francisco General Plan (Urban Design, Environmental Protection, and Commerce and Industry elements, and Central Waterfront Area Plan)	Describes policies for guiding future development within San Francisco.	Section 8.11.7.2	San Francisco Planning Department Jasper Rubin 1660 Mission Street San Francisco, CA 94103 415-558-6310
San Francisco Planning Code	Establishes zoning districts governing land use and requirements for buildings and district improvements.	Section 8.11.7.3	Same as above

TABLE 8.11-3
Laws, Ordinances, Regulations, and Standards Applicable to San Francisco Electric Reliability Project Visual Resources

LORS	Purpose	AFC Section Explaining Conformance	Agency Contact
Caltrans and 49-mile Drive		Section 8.11.7.4	Dennis Cadd State Scenic Highway Coordinator Office of State Landscape Architecture Caltrans 1120 N Street Sacramento, CA 916-654-5370

8.11.7.2 San Francisco General Plan

The project would be located within an existing industrial area within the City and County of San Francisco, and is, therefore, subject to the provisions of the San Francisco General Plan. The San Francisco Zoning Map (1999a) designates the area that includes the project site as M-2 (Heavy Industrial).

Three elements of the General Plan (Urban Design, Environmental Protection, and Commerce and Industry) include provisions for the protection of the landscape and visual resources. The Urban Design Element addresses the physical character and order of the City, and the relationship between people and their environment. The Environmental Protection Element addresses the impact of urbanization, including the use of oil and gas resources and hazardous waste on the natural environment. The Commerce and Industry Element calls for continued economic vitality, social equity, and environmental quality.

In addition, the Central Waterfront Area Plan, a part of the General Plan, has jurisdiction over the project site. The Central Waterfront covers the eastern shoreline of San Francisco between China Basin and Islais Creek and adjacent inland areas. The Central Waterfront Area Plan guides the future development of the Central Waterfront to serve the varying needs and interests of San Francisco. The Area Plan includes maritime and economic development policies, housing policies, and establishes policies regarding transportation, recreation, commerce, and urban design and historic preservation.

The provisions of the City's General Plan that are applicable to the project and visual resources are summarized and evaluated in Table 8.11-4.

TABLE 8.11-4
Conformity of the San Francisco Electric Reliability Project with the San Francisco General Plan

Provision	Discussion of Project's Conformity to Provision
Urban Design Element	
Image and Character Policy 1.1 Recognize and protect major views in the city, with particular attention to those of open space and water.	Implementation of the project would not adversely affect views of open space and the Bay. In addition, the removal of the two existing brick buildings at the site would open up views of the Bay from the west.
Image and Character Policy 1.3 Recognize that buildings, when seen together, produce a total effect that characterizes the city and its districts.	The new buildings, when combined with the existing onsite brick building that will be retained for the project's control/administration building and the other onsite project facilities, would result in a landscape that is consistent with the adjacent power plant, and it would be compatible with surrounding industrial development.
Richness of Past Development Policy 2.4 Preserve notable landmarks and areas of historic, architectural, or aesthetic value, and promote the preservation of other buildings and features that provide continuity with past development.	Due to the level of vandalism and graffiti present at the three existing onsite brick buildings, their aesthetic value is significantly diminished. For a discussion of their historic and architectural value, see Subsection 8.3, Cultural Resources. The use of one of the onsite brick buildings for the project's control/administration building would provide continuity with past development. However, the "setting" of the retained building would be compromised by the construction of the project at the site.
Richness of Past Development Policy 2.5 Use care in remodeling of older buildings, in order to enhance rather than weaken the original character of such buildings.	The original character of the brick building that would be retained for the project's control/administration center would be maintained during the required rehabilitation of the building for project use.
Richness of Past Development Policy 2.6 Respect the character of older development nearby in the design of new buildings.	The new buildings at the project site would be designed to be subordinate to (not draw attention away from) the existing onsite (older) brick building that would be retained for the project's control/administration center. However, it is acknowledged that the "setting" of the building would be compromised by construction of the project at the site.
Richness of Past Development Policy 2.7 Recognize and protect outstanding and unique areas that contribute in an extraordinary degree to San Francisco's visual form and character.	Implementation of the project would not affect areas in San Francisco that are determined to be outstanding and unique, including views of the Bay.
Visual Harmony Policy 3.1 Promote harmony in the visual relationships and transitions between new and older buildings.	The project would include four buildings at the project site, of which one brick (older) building currently exists at the site. The site layout distributes the buildings throughout the project site for project operational efficiency, and also provides a visual transition from the older building to the newer buildings. It is, however, acknowledged that the setting of the brick building would be compromised by the construction of the project at the site.
Visual Harmony Policy 3.2 Avoid extreme contrasts in color, shape, and other characteristics, which will cause new buildings to stand out in excess of their public importance.	The colors proposed to be used for project features would be shades of gray that are standard colors for electrical generation equipment. This would enable the project features to blend with other structures nearby and the Bay, when viewed from the west.

TABLE 8.11-4
Conformity of the San Francisco Electric Reliability Project with the San Francisco General Plan

Provision	Discussion of Project's Conformity to Provision
Visual Harmony Policy 3.3 Promote efforts to achieve high quality of design for buildings to be constructed at prominent locations.	The quality of design of the new project buildings would be typical of that required for power plants. The project site is not considered a "prominent" location within the city, and its design would not limit the design quality of other buildings at prominent locations.
Height and Bulk Policy 3.4 Promote building forms that will respect and improve the integrity of open spaces and other public areas. New buildings should not block significant views of public open spaces, especially large parks and the Bay. Buildings near these open spaces should permit visual access, and in some cases physical access, to them.	Implementation of the project would not adversely affect views of open space or the Bay. In addition, the removal of the two existing brick buildings at the site would open up views of the Bay from the west.
Height and Bulk Policy 3.5 Relate the height of buildings to important attributes of the city pattern and to the height and character of existing development.	The heights of the structures associated with the project would be compatible with the heights of the existing structures on the project site and on the adjacent sites to the east and west.
Height and Bulk Policy 3.6 Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.	The bulk of the structures associated with the project would be compatible with the bulk of the structures on the adjacent sites to the east and west.
Visual Amenity Policy 4.12 Install, promote and maintain landscaping in public and private areas.	This policy is not applicable to the project site because the project site is not a public area, and it is not appropriate to have landscaping within a power plant site.
Visual Amenity Policy 4.14 Remove and obscure distracting and cluttering elements.	Development of the project at the site would require the removal of two older brick buildings, one metal building, and tall weeds, thus removing the cluttering elements at the site. Removal of the two brick buildings would also open up the view of the Bay from the west.
Environmental Protection Element	
Land Policy 7.2 Protect land from changes that would make it unsafe or unsightly. The discussion focuses on excavation of land for off-site use of the removed material, and discourages unnecessary excavation.	Implementation of the project would improve the visual condition of the site by eliminating the tall weeds and removing two brick buildings that are painted with graffiti in the interiors and also pose a public safety hazard. Although construction of the project may involve some excavation at the project site, the land surface at the site would be contoured to near existing elevations, therefore, significant amounts of excavated material are not expected to be transported offsite and such excavation would not be considered unsightly.

TABLE 8.11-4
Conformity of the San Francisco Electric Reliability Project with the San Francisco General Plan

Provision	Discussion of Project's Conformity to Provision
Commerce and Industry Element	
General/Citywide Policy 1.2 Assure that all commercial and industrial uses meet minimum, reasonable performance standards. A critical aspect of development management is to mitigate negative impacts created by new development: economic, aesthetic, physical, environmental, and social. To ensure that commercial and industrial activities do not detract from the environment in which they locate, and may in fact benefit their surroundings, performance standards should be applied in evaluating new developments. The policies of the Master Plan provide many of the standards to be used in evaluating development proposals. Other standards are found in various city ordinances and state and federal laws.	The Applicant would comply with San Francisco's policies presented in its General Plan, the Planning Code, and applicable state and federal laws, ordinances, regulations, and standards addressing visual resources.
Central Waterfront Area Plan	
Land Use Policy 1.3 Promote new development which has minimal adverse environmental consequences. Assure that the adverse environmental impacts of new development are mitigated to the maximum feasible extent.	The Applicant has provided mitigation measures to assure minimization of project impacts.
Urban Design Policy 10.1 Reinforce the visual contrast between the waterfront and hills by limiting the height of structures near the shoreline. Relate the height and bulk of new structures away from the shoreline to the character of the topography and existing development.	The heights and bulk of the structures associated with the project would be compatible with the heights and bulk of existing structures on the project site and on the adjacent sites to the east and west.
Urban Design Policy 10.2 Protect and create views of the downtown skyline and the Bay. Design and locate new development to minimize obstruction of existing views.	Implementation of the project would not affect views of the downtown area of the city, nor would it adversely affect views of the Bay. In addition, the removal of the two existing brick buildings at the site would open up views of the Bay from the west.
Urban Design Policy 10.3 Encourage the rehabilitation of architecturally or historically significant buildings with reuse potential.	The Applicant is proposing to reuse onsite buildings to the extent feasible for the project. The building that is planned to be retained for the project's control/administration center would be rehabilitated. See Section 8.3, Cultural Resources.
Central Basin Subarea Policy 16.2 Assure that any power plant expansion on the Pacific Gas and Electric Company site will provide additional employment and will not adversely affect the environment.	Project implementation would provide jobs related to construction and operation activities. In addition, the Applicant has provided mitigation measures to minimize impacts.
Central Basin Subarea Policy 18.1 Minimize blockage of private and public views and maintain, to the extent feasible, sightlines from Potrero Hill to the waterfront and downtown.	Implementation of the project would not affect views of the downtown area of the city, nor would it adversely affect views of the Bay. In addition, the removal of the two existing brick buildings at the site would open up views of the Bay from the west (including the Potrero Hill area).

Source: City and County of San Francisco, 1995, 1997, 1998b, and 1998c.

8.11.7.3 San Francisco Planning Code

The proposed project would be located in an area that is designated M-2 (Heavy Industrial) by the City and County of San Francisco. The M-2 District is the least restrictive district regarding use. This district is located at the eastern edge of the City, separated from residential and commercial areas. The heavier industries are permitted, with fewer requirements as to screening and enclosure than in the M-1 District, but many of these uses are permitted only as conditional uses or at a considerable distance from Residential Districts. The closest residences to the project site are approximately 600 feet to the west and northwest of the project site.

The provisions of the ordinance that are applicable to the project and visual resources are summarized in Table 8.11-5.

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
Article 1.2 Dimensions, Areas, and Open Spaces	
Section 141 Screening of Rooftop Features R, NC, C, M, SPD, RSD, SLR, SLI AND SSO Districts In R, SPD, RSD, NC, C, M, SLR, SLI and SSO Districts, rooftop mechanical equipment and appurtenances to be used in the operation or maintenance of a building shall be arranged so as not to be visible from any point at or below the roof level of the subject building. This requirement shall apply in construction of new buildings, and in any alteration of mechanical systems of existing buildings that results in significant changes in such rooftop equipment and appurtenances. The features so regulated shall in all cases be either enclosed by outer building walls or parapets, or grouped and screened in a suitable manner, or designed in themselves so that they are balanced and integrated with respect to the design of the building. Minor features not exceeding one foot in height shall be exempted from this regulation.	The Applicant does not intend to arrange mechanical equipment or appurtenances on the roofs of buildings.
Article 2.5 Height and Bulk Districts	
Section 260(a)(3) Height Limits: Measurement Method of Measurement. The limits upon the height of buildings and structures shall be as specified on the Zoning Map. In the measurement of height for purposes of such limits, the following rules shall be applicable: (3) In cases where the height limit is 65 feet or less and a street from which height measurements are made slopes laterally along the lot, or the ground slopes laterally on a lot that also slopes upward from the street, there shall be a maximum width for the portion of the building or structure that may be measured from a single point at curb or ground level, according to the definition of "height," as specified in the following table. These requirements shall not apply to any property to which the bulk limitations in Section 270 of this Code are applicable.	As indicated in this Section, the height limits do not apply to a property to which the bulk limitations in Section 270 apply.

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
Section 260(b)(2)(M) Height Measurement on Lateral Slopes Where Height Limit is 65 Feet or Less Exemptions. In addition to other height exceptions permitted by this Code, the features listed in this Subsection shall be exempt from the height limits established by this Code, in an amount up to but not exceeding that which is specified. The following features shall be exempt, without regard to their horizontal area, provided the limitations for each are observed: (M) Structures and equipment necessary for the operation of industrial plants, transportation facilities, public utilities and government installations, where otherwise permitted by this Code and where such structures and equipment do not contain separate floors, not including towers and antennae for transmission, reception, or relay of radio, television, or other signals where permitted as principal or conditional uses by this Code.	As indicated by this Section, the proposed project is exempt from height limits.
Section 270(a) Bulk Limits: Measurement The limits upon the bulk of buildings and structures shall be as stated in this Section and in Sections 271 and 272. The terms "height," "plan dimensions," "length" and "diagonal dimensions" shall be as defined in this Code. In each height and bulk district, the maximum plan dimensions shall be as specified in Table 270 Bulk Limits, at all horizontal cross-sections above the height indicated.	Noted. As indicated by Section 270(b) below, the bulk limits stated in this Section are superceded and do not apply to the project.
Section 270(b) Bulk Limits: Measurement These limits shall not apply to the buildings, structures and equipment listed in Section 260(b)(2)(K), (L), (M), and (N) of this Code, subject to the limitations expressed herein.	Noted. Section 260(b)(2)(M) Height Measurement on Lateral Slopes Where Height Limit is 65 Feet or Less is applicable to the proposed project (and is discussed above), therefore, the project is not subject to bulk limitations.
Article 6 Signs	
Section 607 Commercial and Industrial Districts Signs in C and M Districts, other than those signs exempted by Section 603 of this Code, shall conform to the following provisions: (a) General Advertising Signs. No general advertising sign shall be permitted in any C-1 District or within 200 feet of the park known as Union Square and visible from said park, except that a replacement sign of the same size or smaller, of the same type as defined in this Code or as interpreted by the Zoning Administrator, and at the same approximate location as an existing sign would be allowed within 200 feet of said park provided that the sign is otherwise permitted by the Planning Code, would cast no additional shadow upon Union Square, has no intensification of lighting as determined by the Zoning Administrator, and is not internally lighted or backlighted. Use of neon is not precluded by this provision. Temporary general advertising signs determined by the	The Applicant proposes to install one sign at the gated entrance to the project site. The sign proposed for the project would not be for advertising, would not be a roof sign, would not be a wind sign, would not have moving parts, would not be illuminated, would not be projected, would not be attached to a building, and would not be an automobile service station sign. Therefore, the provisions in Section 607 associated with those specifications would not apply to the proposed project. The proposed sign would be freestanding, therefore, the provisions of Section 607(g)(2) would apply.

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
Zoning Administrator to be at pedestrian level and less than 50 square feet in size are not precluded by this provision.	
(b) Roof Signs. Roof signs shall be permitted in all C and M Districts other than C-1 only if Subsections (1) through (3) below are satisfied; except that a roof sign that is designated historic pursuant to Sections 303 and 608.14 of this Code may be permitted without regard to Subsections (1) through (3) below:	
(1) The sign does not extend more than 25 feet above the roofline of the building on or over which the sign is placed; and	
(2) All parts of the sign are within 25 feet of, and the sign is mounted at not more than a 45-degree angle from, a wall of a building the roofline of which is at least as high as the top of the sign; and	
(3) Such wall forms a complete backdrop for the sign, as the sign is viewed from all points from which the sign is legible from a public street or alley.	
(c) Wind Signs. No wind sign shall be permitted in any C or M District.	
(d) Moving Parts. No sign shall have or consist of any moving, rotating, or otherwise physically animated part (as distinguished from lights that give the appearance of animation by flashing, blinking or fluctuating), except as follows:	
(1) Moving or rotating or otherwise physically animated parts may be used for the rotation of barber poles and the indication of time of day and temperature.	
(2) In the case of a general advertising sign in C-2, C-3, C-M, M-1 and M-2 Districts, except for signs located within 200 feet of the park known as Union Square and visible from said park and signs located so as to be primarily viewed by persons traveling on any portion of a freeway, moving or otherwise physically animated parts may be used if such parts do not exceed a velocity of one complete cycle in a four-second period where such parts constitute less than 30 percent of the area of the sign or if, where such parts constitute a greater area of the sign, they do not exceed a velocity of one complete cycle in a four-second period and are stationary at least half of each eight-second period; except that signs designated historic pursuant to Sections 303 and 608.14 of this Code may have such moving features otherwise prohibited for signs located so as to be primarily viewed by persons traveling on any portion of a freeway.	
(3) Notwithstanding the type of signs permissible under subparagraph (d), a video sign is prohibited.	
(4) Notwithstanding the type of signs permissible under	

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
subparagraph (d)(2), a sign that rotates is prohibited. (e) Illumination. Any sign may be nonilluminated or indirectly or directly illuminated. Signs in C-3, C-M, M-1 and M-2 Districts shall not be limited in any manner as to type of illumination, but no sign in a C-1 or C-2 District shall have or consist of any flashing, blinking, fluctuating or otherwise animated light except in each of the following special sign districts, all as specifically designated as "Special Districts for Sign Illumination" on Sectional Map SSD of the Zoning Map of the City and County of San Francisco, described in Section 608 of this Code: (1) In the C-2 area consisting of five blocks in the vicinity of Fisherman's Wharf; (2) In the C-2 area in the vicinity of Van Ness Avenue from Golden Gate Avenue and Eddy Street to Sacramento Street, and Polk Street from Eddy Street to Geary Street, also known as the Automotive Special Use District; (3) In the C-2 area in the vicinity of Stockton, Washington and Kearny Streets and Broadway, also known as Washington-Broadway Special Use District Number 1. (4) Notwithstanding the type of signs permissible under subparagraph (e), a video sign is prohibited in the districts described in subparagraphs (1)-(3). (f) Projection. No sign shall project more than 75 percent of the horizontal distance from the street property line to the curbline and in no case shall a sign project more than 10 feet beyond the street property line or building setback line in C-1 Districts, or 12 feet beyond the street property line or building setback line in any other C or M District. (g) Height and Extension Above Roofline. (1) Signs Attached to Buildings. Except as provided in Section 260 for historic signs in historic districts, no sign attached to a building shall extend or be located above the roofline of the building to which it is attached; except that up to ½ the area of a business sign attached to the street wall of a building may extend above the roofline, up to the maximum height permitted for freestanding signs in the same district or 10 feet above the roofline, whichever is the lesser. In addition, no sign attached to a building shall under any circumstances exceed the following maximum heights: In C-1: 40 feet; In C-3: 100 feet; In all other C and M Districts: 60 feet. The 100-foot height limitation stated herein shall not apply to the modification or replacement of any currently	

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
existing wall signs so long as such modified or replacement sign is generally in the same location and not larger in surface area and projection than existing signs being modified or replaced. Such signs may contain letters, numbers, a logo, service mark and/or trademark and may be nonilluminated or indirectly illuminated.	
(2) Freestanding Signs. The maximum height for freestanding signs shall be as follows:	
In C-1: 24 feet;	
In C-2: 36 feet;	
In all other C and M Districts: 40 feet.	
(h) Special Standards for Automobile Service Stations. For automobile service stations, only the following signs are permitted, subject to the standards in this Subsection (h) and to all other standards in this Section 607.	
(1) A maximum of two oil company signs, which shall not extend more than 10 feet above the roofline if attached to a building, or exceed the maximum height permitted for freestanding signs in the same district if freestanding. The area of any such sign shall not exceed 180 square feet, and along each street frontage all parts of such a sign or signs that are within 10 feet of the street property line shall not exceed 80 square feet in area. No such sign shall project more than five feet beyond any street property line or building setback line. The areas of other permanent and temporary signs as covered in Paragraph 607(h)(2) below shall not be included in the calculation of the areas specified in this paragraph.	The Applicant would comply with this provision by ensuring that the proposed sign would be less than 40 feet tall.
(2) Other permanent and temporary business signs, not to exceed 30 square feet in area for each such sign or a total of 180 square feet for all such signs on the premises. No such sign shall extend above the roofline if attached to a building, or in any case project beyond any street property line or building setback line.	
(3) General advertising signs meeting the provisions of this Section 607.	

Source: City and County of San Francisco, 1999b.

8.11.7.4 Scenic Roadway Programs

This section discusses the California State Scenic Highway Program and the 49-Mile Scenic Drive in San Francisco, and the project's potential effects on those scenic road systems.

In 1963, the State Legislature established the California Scenic Highway Program. The goal of the California Scenic Highway Program is to preserve and enhance the natural beauty of California. CALTRANS maintains the system of designated and eligible scenic highways,

with the intent of recognizing and protecting the more scenic corridors along the state highway system. The Bay Bridge (Interstate-80 [I-80]) and I-280 near the project site are eligible for scenic highway designation; however, these segments have not been officially designated. The eligible section of I-80 in San Francisco extends from I-280 near First Street in San Francisco to Route 61 in Oakland. The eligible section of I-280 extends from SR 17 in Santa Clara County to I-80 near First Street in San Francisco (CALTRANS, 2003). Protection of scenic qualities along designated scenic highways is the responsibility of the local agency. No local agency has applied to CALTRANS to designate I-280 near the project site as a state scenic highway, therefore, no specific policies have been implemented to protect scenic qualities in this corridor. No significant long-term impact on the landscape along I-280 is expected as a result of implementation of the project.

The 49-Mile Scenic Drive in San Francisco was first introduced in 1938. The route is a complete loop of the City that passes by San Francisco's scenic attractions and historic highlights. It passes through the project vicinity (along Indiana Street and I-280). The Scenic Drive is a well-known and frequently traveled tourist route, and for the most part, is not a state eligible or designated scenic highway. Certain roadway segments of the Scenic Drive are regulated through the City and County Planning Code; the segments of the Scenic Drive along Indiana Street and I-280 that are in the project vicinity are not specified in the Planning Code. No significant long-term impact on the landscape along the 49-Mile Scenic Drive is expected as a result of project implementation.

8.11.7.5 Summary of Project's Conformity with Applicable LORS

The project is consistent with applicable laws, ordinances, regulations, and standards related to visual resource issues.

Other plans that were reviewed for applicability to the project and visual resources included the following:

- **The Port of San Francisco Waterfront Land Use Plan (2002) and Waterfront Design & Access Element (2000):** The project site is located along the west side of the Bay; however, the site is not located within the planning boundary of the Waterfront Land Use Plan. Therefore, no further discussion of the Plan is provided.

- **The San Francisco Bay Area Seaport Plan (1997)**: The Plan designates areas determined to be necessary for future port development as *port priority use areas* (areas to be reserved for port-related and other uses that will not impede development of the sites for port purposes). The project site is located within a port priority use area; however, no policies applicable to visual resources are provided in the Plan. Therefore, no further discussion of the Plan is provided.

- **The San Francisco Bay Plan (2003):** The Plan has jurisdiction over the San Francisco Bay and a shoreline band consisting of all territory located between the shoreline of San Francisco Bay and 100 feet landward. The project site is located approximately 930 feet from the shoreline, therefore, the Bay Plan is not applicable to the project, and no further discussion of the Bay Plan is provided.

8.11.8 References

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City and County of San Francisco (CCSF). 2003. Resolution No. 458-03. Resolution opposing the proposed Potrero Unit 7 power plant project and urging City officials and departments not to enter into any agreements that may be required to facilitate or enable the siting, licensing, approval or construction of the proposed Potrero Unit 7 power plant and urging the City Attorney to actively oppose the Potrero Unit 7 project in all forums. Adopted July 8, 2003.

City and County of San Francisco (CCSF). 2002. Resolution No. 827-02. Resolution endorsing the electricity resource plan for San Francisco. Adopted December 9, 2002.

City and County of San Francisco (CCSF). 2001. Ordinance No. 124-01. Ordinance adopting minimum requirements for the protection of human health and the environment for any proposal for new electric generation at the Potrero Power Plant in Southeast San Francisco; and requiring all City officials and departments to advocate these requirements, and greater protections, in regulatory proceedings and negotiations regarding the proposal to build a new power plant at the site of the existing Potrero Power Plant; and requiring approval of the Board of Supervisors for any agreement by City officials or departments for new electric generation in Southeast San Francisco. Passed May 29, 2001.

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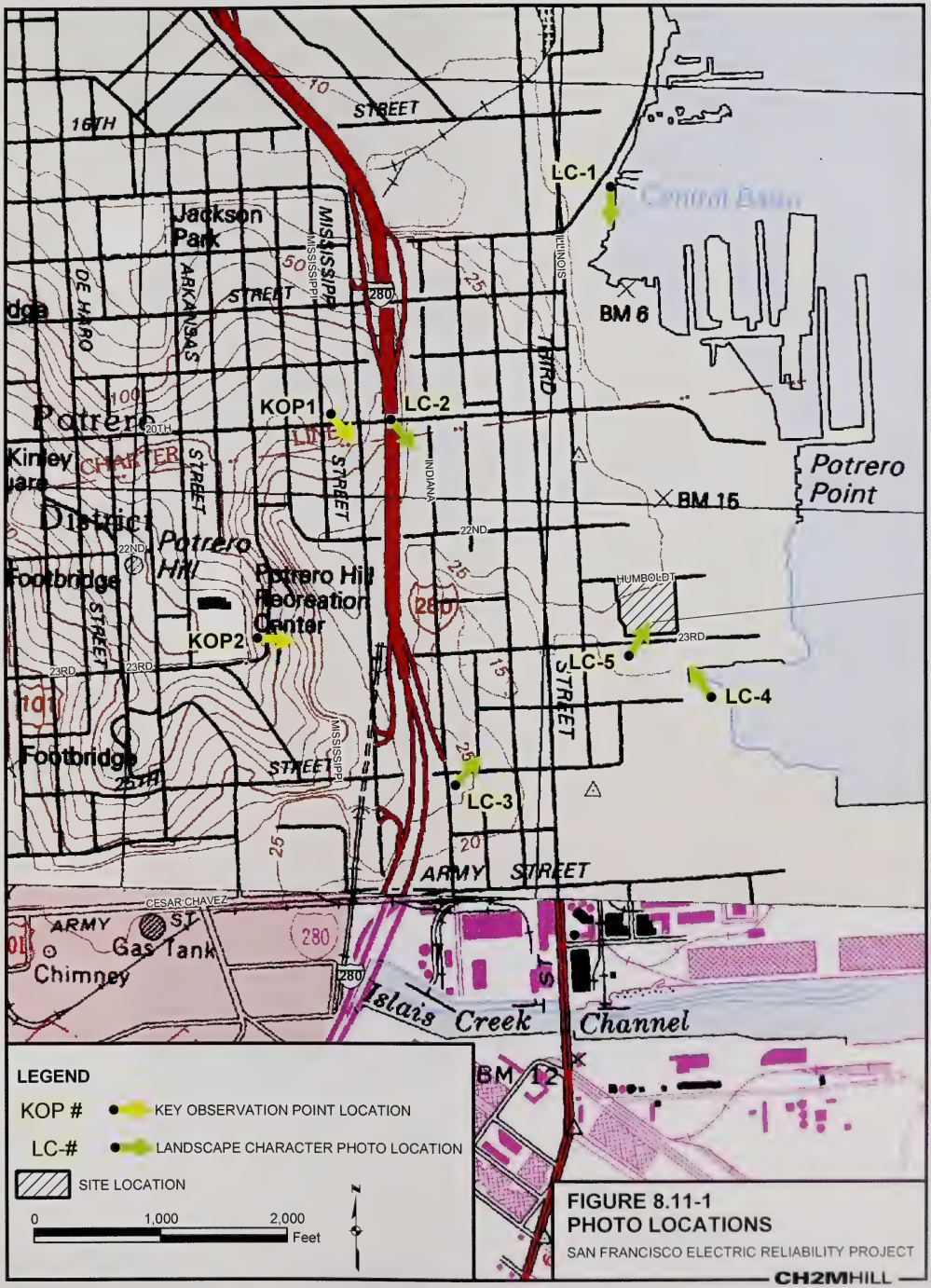


FIGURE 8.11-1
PHOTO LOCATIONS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL



LC-1. Looking south from the Agua Vista Park toward the project site. The park is located approximately 0.65 mile from the site. The project would be located in the left one-third of the photo near the existing 300-foot-high Potrero Unit 3 stack



LC-2. Looking southeast toward the project site from the 20th Street overcrossing of I-280, approximately 0.4 mile from the site. The 300-foot-high stack is shown toward the left of the photo, near where proposed project features would be located.

FIGURE 8.11-2
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-1 AND LC-2)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT



Looking northeast from a multi-story single-family residential building located at 1415 Indiana Street (between 25th and 26th streets), located approximately 0.3 mile southwest of the project site. Views toward the project site from the lower levels of this building would be mostly, if not completely, screened by the industrial buildings in the foreground of the view.

FIGURE 8.11-3
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTO LC-3)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT



LC-4. At Warm Water Cove Park looking northwest toward the project s
site from this park are, to a large degree, screened due to the presence
project site is seen in the right one-third of the photo; this building woul





LC-5. On 23rd Street looking northeast toward the project site. Two la
The metal building in the far left foreground of the photo is the PG&E
high stack that is located adjacent to the project site on its east side.
blocks the view of much of the project site.

is shown. This building would become the control building for the project.
s part of the project. Shown at the far right of the photo is the 300-foot-
side of this warehouse building is visible as the white building that

FIGURE 8.11-4
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-4 AND LC-5)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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CH2MHILL



LC-4. At Warm Water Cove Park looking northwest toward the project site. The park is located approximately 0.2 mile southeast of the project site. Views toward the site from this park are, to a large degree, screened due to the presence of the large white building. A small portion of one of the brick buildings that are currently at the project site is seen in the right one-third of the photo; this building would be removed as part of the project.



LC-5. On 23rd Street looking northeast toward the project site. Two large brick buildings exist in the foreground (which would be removed as part of the project). In the left one-third of the photo, the roof line of a third brick building in the distance is shown. This building would become the control building for the project. The metal building in the far left foreground of the photo is the PG&E control building for the substation located adjacent to and to the west of the project site. The metal building in the left one-third of the photo in the distance would be removed as part of the project. Shown at the far right of the photo is the 300-foot-high stack that is located adjacent to the project site on its east side. The building shown in the far right of the photo is a warehouse building located on the south side of 23rd Street. In the view from Warm Water Cove Park (photo LC-4), the back side of this warehouse building is visible as the white building that blocks the view of much of the project site.

FIGURE 8.11-4
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-4 AND LC-5)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

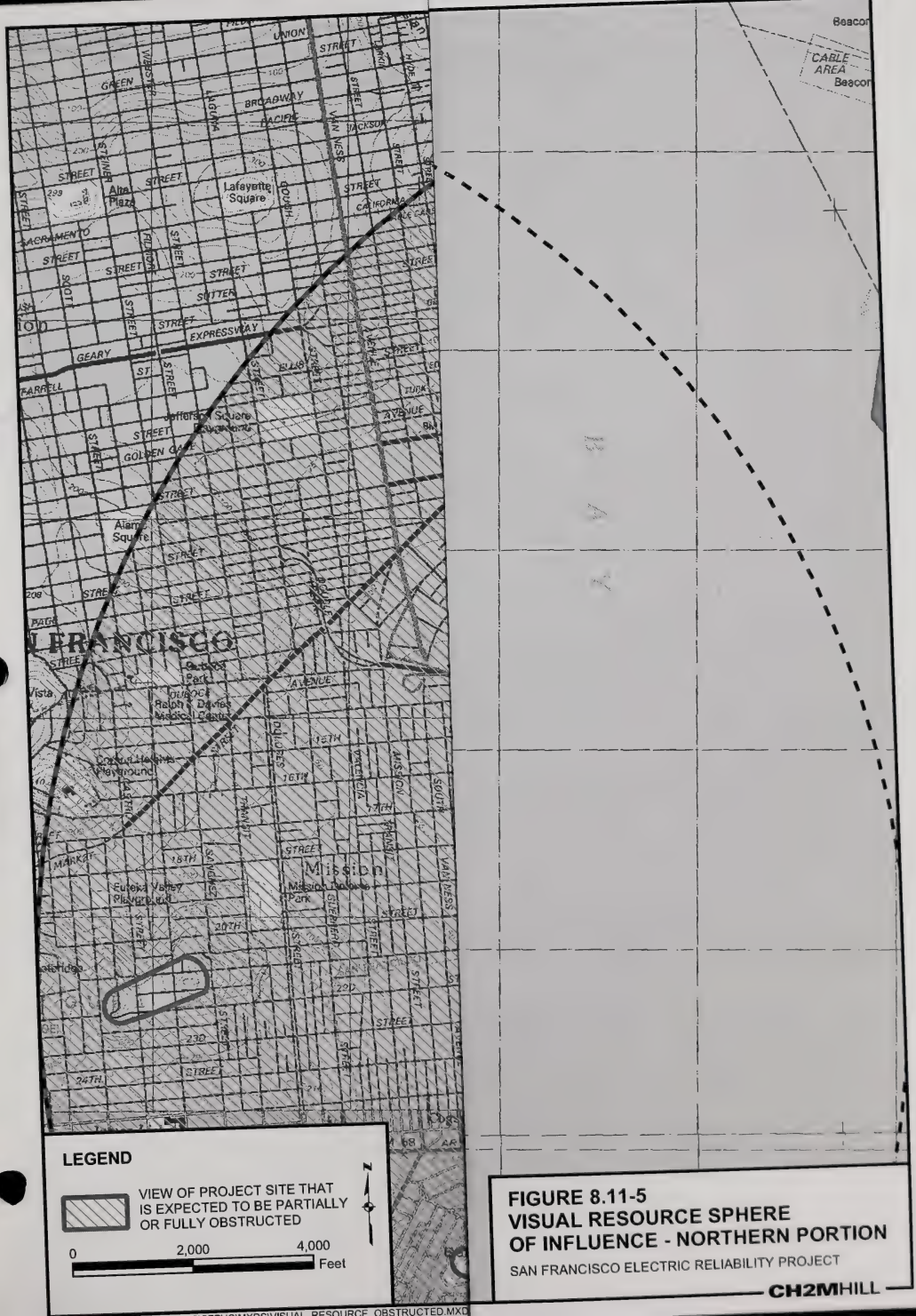


FIGURE 8.11-5
VISUAL RESOURCE SPHERE OF INFLUENCE - NORTHERN PORTION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

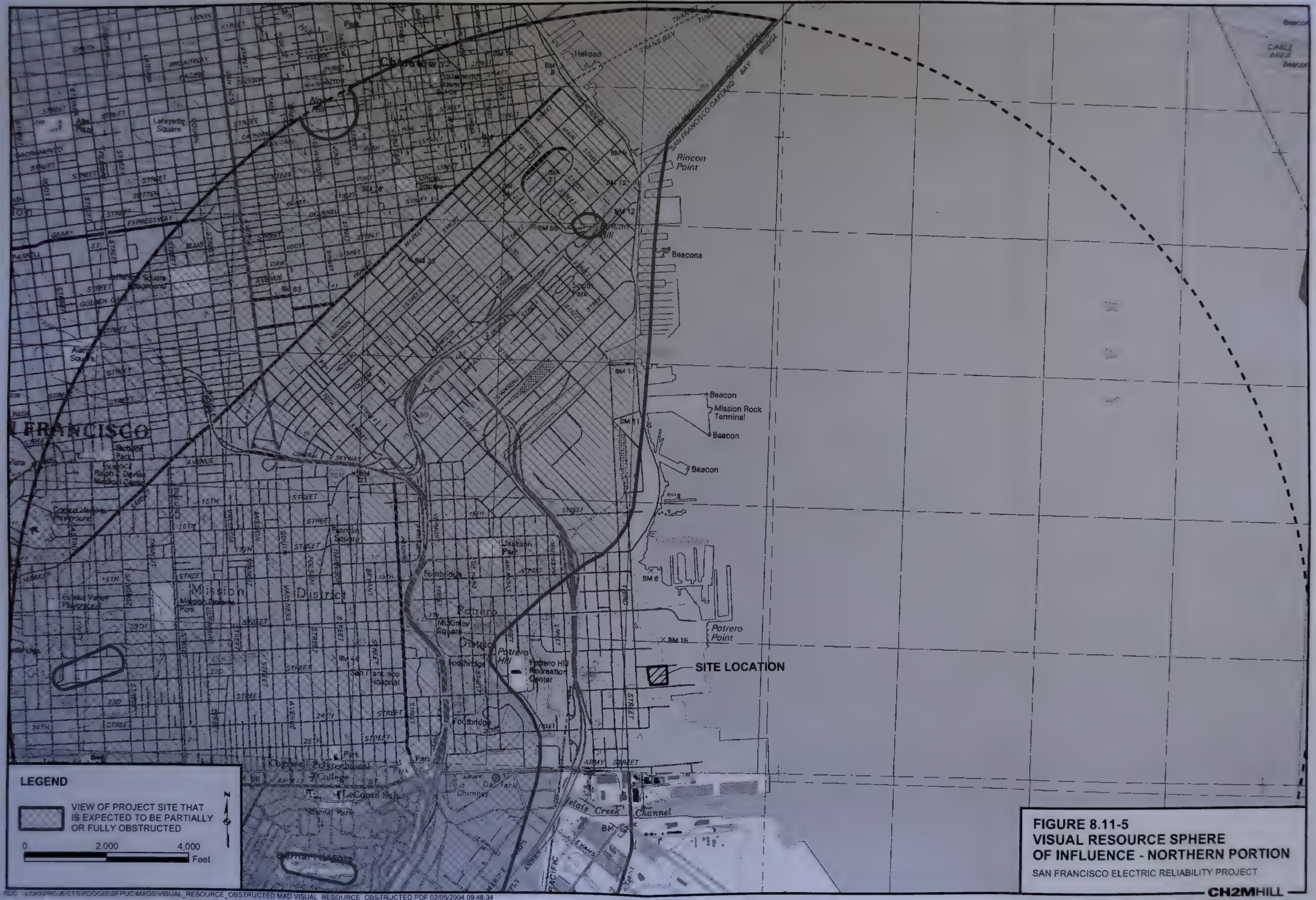


FIGURE 8.11-5
VISUAL RESOURCE SPHERE OF INFLUENCE - NORTHERN PORTION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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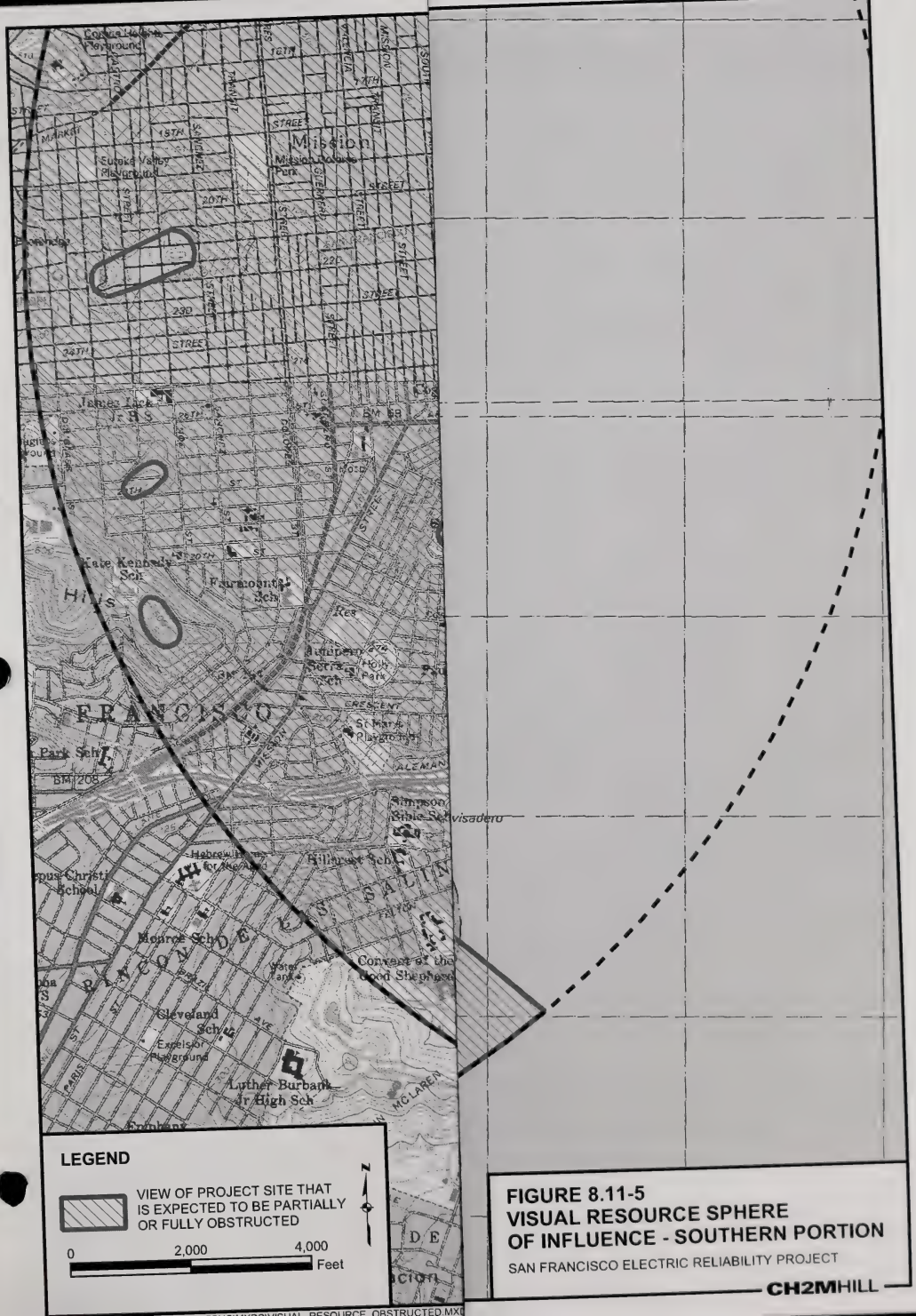


FIGURE 8.11-5
VISUAL RESOURCE SPHERE OF INFLUENCE - SOUTHERN PORTION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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FIGURE 8.11-5
VISUAL RESOURCE SPHERE OF INFLUENCE - SOUTHERN PORTION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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KOP 1: Simulated view of the project site from 20th Street at Mississippi Street.

FIGURE 8.11-6b
KOP 1: SIMULATED VIEW OF THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIAB

CH2MHILL



KOP 1: Existing view of the project site from 20th Street at Mississippi Street.

FIGURE 8.11-6a
KOP 1: EXISTING VIEW OF THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT



KOP 1: Simulated view of the project site from 20th Street at Mississippi Street.

FIGURE 8.11-6b
KOP 1: SIMULATED VIEW OF THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIAB

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KOP 2: Simulated view of the project site from Missouri Street at Watchman Way.

FIGURE 8.11-7b
KOP 2: SIMULATED VIEW OF THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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KOP 2: Existing view of the project site from Missouri Street at Watchman Way.

FIGURE 8.11-7a
KOP 2: EXISTING VIEW OF THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT



KOP 2: Simulated view of the project site from Missouri Street at Watchman Way.

FIGURE 8.11-7b
KOP 2: SIMULATED VIEW OF THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

SUBSECTION 8.12

Hazardous Materials Handling

8.12 Hazardous Materials Handling

8.12.1 Introduction and Summary

This subsection evaluates the potential effects on human health and the environment from the storage and use of hazardous materials in conjunction with the proposed San Francisco Electric Reliability Project (SFERP). Subsection 8.12.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to hazardous materials; Subsection 8.12.3 describes the existing environment that may be affected, and Subsection 8.12.4 identifies potential impacts on that environment and on human health from site development. Subsection 8.12.5 discusses the offsite migration modeling. Subsection 8.12.6 discusses fire and explosion risk. Subsection 8.12.7 addresses potential cumulative impacts, Subsection 8.12.8 presents proposed mitigation measures, and Subsection 8.12.9 describes the agencies involved and provides agency contacts. Subsection 8.12.10 describes permits required and the permit schedule. Subsection 8.12.11 provides the references used to develop this section. Hazardous waste management, including handling of potentially contaminated soil and groundwater, is addressed in Subsection 8.13, Waste Management.

Most of the hazardous materials that will be used for the project are required for treatment and laboratory analysis of the cooling water, facility maintenance, wastewater treatment, and lubrication of equipment or will be contained within transformers and electrical switches. The project will comply with applicable laws and regulations for the storage of these materials to minimize the potential for a release of hazardous materials and will conduct emergency response planning to address public health concerns regarding hazardous materials storage.

Onsite storage of aqueous ammonia, required for the control of oxides of nitrogen emissions, presents the greatest potential public health risk due to the chemical properties of ammonia. However, the project includes specific design features (described in Subsection 8.12.4.2), that will control the extent of a gaseous release in the event of a catastrophic spill of ammonia. In addition, an offsite consequence analysis conducted for the project indicates that in the unlikely event of a catastrophic release, gaseous ammonia concentrations would not exceed 75 parts per million (ppm) (below California Energy Commission [CEC] significance level) beyond the property boundary to the north, south, or west, and not more than 90 feet from the ammonia tank to the east (barely over the property boundary between the proposed project and the existing Potrero Power Plant [Potrero PP] property). Therefore, storage of ammonia at the proposed project site will not present an unacceptable public health risk. Nevertheless, Applicant will prepare and maintain a risk management plan (RMP), described in Subsection 8.12.8.2.3, addressing the potential effects of an accidental release, a program for preventing a release, and emergency response procedures in the event of a release. The plan will be submitted to the San Francisco Department of Public Health and distributed to other agencies including the San Francisco Fire Department, which will be potentially responsible for assisting plant personnel in the event of a chemical emergency. Preparation and implementation of the RMP will further reduce the public health risks associated with the storage of ammonia at the SFERP.

8.12.2 Laws, Ordinances, Regulations, and Standards

The storage and use of hazardous materials and regulated substances at the facility are governed by federal, state, and local laws. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination, and to protect facility workers and the surrounding community from exposure to hazardous and regulated substances. The applicable LORS are summarized in Table 8.12-1 and described below.

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
Federal		
CERCLA/SARA/EPCRA		
Section 302, EPCRA (Pub. L. 99–499, 42 USC 11022) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires one time notification if extremely hazardous substances are stored in excess of TPQs. The facility will have ammonia in concentrations greater than 20 percent and in excess of the threshold quantity of 20,000 pounds.	An RMP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.8.2.2).
Section 304, EPCRA (Pub. L. 99–499, 42 USC 11002) Emergency Planning And Notification (40 CFR 355)	Requires notification when there is a release of hazardous material in excess of its RQ.	An HMBP will be prepared to describe notification and reporting procedures (Subsection 8.12.8.2.1).
Section 311, EPCRA (Pub. L. 99–499, 42 USC 11021) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires that either material safety data sheets (MSDSs) for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and local fire department.	The HMBP to be prepared will include a list of hazardous materials for submission to agencies (Subsection 8.12.8.2.1).
Section 313, EPCRA (Pub. L. 99–499, 42 USC 11023) Toxic Chemical Release Reporting: Community Right-To-Know (40 CFR 372)	Requires annual reporting of releases of hazardous materials.	The HMBP to be prepared will describe reporting procedures (Subsection 8.12.8.2.1).
Section 112, Clean Air Act Amendments (Pub. L. 101–549, 42 USC 7412) Chemical Accident Prevention Provisions (40 CFR 68)	Requires facilities that store a listed hazardous material at a quantity greater than the TQ to develop a Risk Management Plan. The facility will have ammonia in concentrations greater than 20 percent and in excess of the threshold quantity of 20,000 pounds.	An RMP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.8.2.2).
Section 311, Clean Water Act (Pub. L. 92–500, 33 USC 1251 et seq.) Oil Pollution Prevention (40 CFR 112)	Requires preparation of an SPCC plan if oil is stored in a single aboveground storage tank with a capacity greater than 660 gallons or if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will have petroleum in excess of the aggregate volume of 1,320 gallons.	An SPCC will be prepared (Subsection 8.12.8.2.3).

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
Pipeline Safety Laws (49 USC 60101 et seq.) Hazardous Materials Transportation Laws (49 USC 5101 et seq.) Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards (49 CFR 192)	Specifies natural gas pipeline construction, safety, and transportation requirements.	The natural gas pipeline will be constructed in accordance with 49 CFR requirements (Subsection 8.12.6).
California		
Health and Safety Code, Section 25500, et seq. (HMBP)	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of threshold quantities.	An HMBP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.6.2).
Health and Safety Code, Section 25531 through 25543.4 (CalARP)	Requires registration with local CUPA or lead agency and preparation of an RMP if regulated substances are handled or stored in excess of TPQs.	An RMP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.6.2).
Health and Safety Code, Section 25270 through 25270.13 (Aboveground Petroleum Storage Act)	Requires preparation of an SPCC plan if oil is stored in a single aboveground storage tank with a capacity greater than 660 gallons or if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will have petroleum in excess of the aggregate volume of 1,320 gallons.	An SPCC plan will be prepared (Subsection 8.12.6.2.3).
Health and Safety Code, Section 25249.5 through 25249.13 (Safe Drinking Water and Toxics Enforcement Act) (Proposition 65)	Requires warning to persons exposed to a list of carcinogenic and reproductive toxins and protection of drinking water from same toxins.	The site will be appropriately labeled for chemicals on the Proposition 65 list.
California Public Utilities Commission (CPUC) General Order Nos. 112-E and 58-A	Specify standards for gas service and construction of gas gathering, transmission, and distribution piping systems.	Construction of the natural gas pipeline will comply with the standards specified in these General Orders (Subsection 8.12.6).
Local		
San Francisco Public Health Code, Article 21	Requires preparation of a Hazardous Materials Certificate of Registration and Hazardous Materials Business Plan for storage of hazardous materials.	A Hazardous Materials Certificate of Registration and HMBP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.8.2.1).
San Francisco Public Health Code, Article 21A	Requires preparation of a Risk Management Plan for regulated substances.	An RMP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.8.2.2).

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
San Francisco Fire Code	Requires proper storage and handling of hazardous materials.	San Francisco Fire Code will be followed for design and construction of the hazardous materials handling facilities (Subsection 8.12.8.2.1).

Notes:

Cal ARP	California Accidental Release Program
CAA	Clean Air Act [Amendments]
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CUPA	Certified Unified Program Agency
EHS	extremely hazardous substance
EPCRA	Emergency Planning and Community Right-to-Know Act
HMBP	Hazardous Materials Business Plan
LEPC	local emergency planning committee
MSDS	Material Safety Data Sheet
Pub. L.	Public Law
RMP	Risk Management Plan
RQ	Reportable Quantity
SARA	Superfund Amendments and Reauthorization Act
SERC	state emergency response commission
SPCC	Spill Prevention Control and Countermeasure Plan
TPQ	Threshold Planning Quantity
TQ	Threshold Quantity
USC	United States Code

8.12.2.1 Federal

Hazardous materials are governed under the Comprehensive Environmental Response and Liability Act (CERCLA), the Clean Air Act (CAA), and the Clean Water Act (CWA).

8.12.2.1.1 CERCLA. The Superfund Amendments and Reauthorization Act (SARA) amends CERCLA and governs hazardous substances. The applicable part of SARA for the proposed project is Title III, otherwise known as the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA). Title III requires states to establish a process for developing local chemical emergency preparedness programs and to receive and disseminate information on hazardous substances present at facilities in local communities. The law provides primarily for planning, reporting, and notification concerning hazardous substances. Key sections of the law are:

- Section 302—Requires one time notification when extremely hazardous substances (EHSs) are present in excess of their threshold planning quantities (TPQs). EHSs and their TPQs are found in Appendices A and B to 40 Code of Federal Regulations (CFR) Part 355.
- Section 304—Requires immediate notification to the local emergency planning committee (LEPC) and the state emergency response commission (SERC) when a hazardous material is released in excess of its reportable quantity (RQ). If a CERCLA-listed hazardous substance RQ is released, notification must also be given to the National Response Center in Washington, D.C. (RQs are listed in 40 CFR Part 302, Table 302.4). These notifications are in addition to notifications given to the local emergency response team or fire personnel.
- Section 311—Requires that either material safety data sheets (MSDSs) for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and local fire department.

- Section 313—Requires annual reporting of hazardous materials released into the environment either routinely or as a result of an accident.

8.12.2.1.2 Clean Air Act. Regulations (40 CFR 68) under the CAA are designed to prevent accidental releases of hazardous materials. The regulations require facilities that store a Threshold Quantity (TQ) or greater of listed regulated substances to develop a Risk Management Plan (RMP), including hazard assessments and response programs to prevent accidental releases of listed chemicals. Section 112(r)(5) of the CAA discusses the regulated substances. These substances are listed in 40 CFR 68.130. Aqueous ammonia is a listed substance and its TQ for solutions of 20 percent and greater is 20,000 pounds of solution.

8.12.2.1.3 Clean Water Act. The Spill Prevention, Control, and Countermeasures (SPCC) program under the CWA is designed to prevent or contain the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Regulations (40 CFR 112) under the CWA require facilities to prepare a written SPCC Plan if they store oil and its release would pose a threat to navigable waters. The SPCC program is applicable if a facility has a single oil aboveground storage tank (AST) with a capacity greater than 660 gallons, total petroleum storage (including ASTs, oil-filled equipment and drums) greater than 1,320 gallons, or underground storage capacity greater than 42,000 gallons.

Other related federal laws that address hazardous materials but do not specifically address their handling, are the Resource Conservation and Recovery Act (RCRA), which is discussed in Section 8.13, Waste Management, and the Occupational Safety and Health Act, which is discussed in Section 8.7, Worker Health and Safety.

8.12.2.1.4 Natural Gas Pipeline Construction and Safety. Title 40 of the Code of Federal Regulations, parts 190 through 192, specifies safety and construction requirements for natural gas pipelines. Part 190 outlines pipeline safety procedures, Part 191 requires a written report for any reportable incident, and Part 192 specifies minimum safety requirements for pipelines.

8.12.2.2 State

California laws and regulations relevant to hazardous materials handling at the facility include Health and Safety Code Section 25500 (hazardous materials), Health and Safety Code 25531 (regulated substances), and the Aboveground Petroleum Storage Act (petroleum in aboveground tanks).

8.12.2.2.1 Health and Safety Code Section 25500. California Health and Safety Code, Section 25500, et seq., and the related regulations in 19 California Code of Regulations (CCR) 2620, et seq., require local governments to regulate local business storage of hazardous materials in excess of certain quantities. The law also requires that entities storing hazardous materials be prepared to respond to releases. Those using and storing hazardous materials are required to submit a Hazardous Materials Business Plan (HMBP) to their local Certified Unified Program Agency (CUPA) and to report releases to their CUPA and the State Office of Emergency Services. The threshold quantities for hazardous materials are 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases measured at standard temperature and pressure.

8.12.2.2.2 Health and Safety Code Section 25531 (California Accidental Release Program). California Health and Safety Code, Section 25531, et seq., and the California Accidental Release Program (CalARP) regulate the registration and handling of regulated substances. Regulated substances are any chemicals designated as an extremely hazardous substance by the U. S. Environmental Protection Agency (USEPA) as part of its implementation of Superfund Amendments and Reauthorization Act (SARA) Title III. Health and Safety Code Section 25531 overlaps or duplicates some of the requirements of SARA and the CAA. Facilities handling or storing regulated substances at or above TPQs must register with their local CUPA and prepare an RMP, formerly known as a Risk Management and Prevention Program (RMPP). The CalARP is found in Title 19, CCR, Chapter 4.5. The TPQ for ammonia is 500 pounds. Portions of the aqueous ammonia process that can be demonstrated to have a partial pressure of the regulated substance in the mixture (solution), under the handling or storage conditions, which is less than 10 millimeters of mercury (mm Hg) does not count toward the threshold.

8.12.2.2.3 Aboveground Petroleum Storage Act. Health and Safety Code Sections 25270 to 25270.13 ensure compliance with the federal CWA. The law applies to facilities that operate a petroleum AST with a capacity greater than 660 gallons or combined ASTs capacity greater than 1,320 gallons or oil-filled equipment where there is a reasonable possibility that the tank(s) or equipment may discharge oil in "harmful quantities" into navigable waters or adjoining shore lands. If a facility falls under these criteria, it must prepare a SPCC plan.

8.12.2.2.4 Safe Drinking Water and Toxics Enforcement Act (Proposition 65). This law identifies chemicals that cause cancer and reproductive toxicity, provides information for the public, and prevents discharge of the chemicals into sources of drinking water. Lists of the chemicals of concern are published and updated periodically. The Act is administered by California's Office of Environmental Health Hazard Assessment. Some of the chemicals to be used at the facility are on the cancer-causing and reproductive-toxicity lists of the Act.

8.12.2.2.5 Natural Gas Pipeline Construction and Safety. The California Public Utilities Commission enforces General Order No. 58-A specifying standards for natural gas service in the State of California, and General Order No. 112-E specifying rules governing the design, construction, testing, operation, and maintenance of natural gas gathering, transmission, and distribution piping systems.

8.12.2.3 Local

The City and County of San Francisco (CCSF) have the responsibility for administering hazardous materials requirements and ensuring compliance with federal and state laws in San Francisco.

8.12.2.3.1 Hazardous Materials Storage and Handling. The requirements for hazardous materials handling are specified in the San Francisco Public Health Code, enforced by the San Francisco Department of Public Health (SFDPH), Environmental Health Section. Article 21 incorporates the California Underground Storage Tank Regulations (California H&S Code, Chapters 6.7 and 6.75), Hazardous Materials Release Response Plans and Inventory Regulations requiring preparation of a Hazardous Materials Business Plan (HMBP) (California H&S Code, Chapter 6.95, Article 1), Aboveground Petroleum Storage Tank Regulations requiring preparation of a SPCC plan (California H&S Code, Section 25270.5), and hazardous materials management provisions of the Uniform Fire Code

requiring Hazardous Materials Inventories (Uniform Fire Code, Sections 8001.3.2[a] and 8001.3.3[a]). It also provides for additional stricter local requirements. Article 21 also requires conformance with applicable hazardous materials requirements of the San Francisco Building Code, Electric Code, Public Works Code, Fire Code and City Planning Code. Article 80 of the San Francisco Fire Code incorporates the hazardous materials handling requirements of the Uniform Fire Code, discussed below, and is enforced by the San Francisco Fire Department.

8.12.2.3.2 Regulated Substances Handling. The requirements for handling of regulated substances, including the preparation of an RMP, are specified in Article 22A of the San Francisco Public Health Code, enforced by the SFDPH. This article incorporates the requirements of CalARP, described above.

8.12.2.4 Codes

The design, engineering, and construction of hazardous materials storage and dispensing systems will be in accordance with all applicable codes and standards, including the following:

- California Vehicle Code, 13 CCR 1160, et seq.—Provides the California Highway Patrol (CHP) with authority to adopt regulations for the transportation of hazardous materials in California.
- The California Fire Code, Articles 79 and 80—The hazardous materials sections of the Fire Code. Local fire agencies or departments enforce this code and can require that an HMBP and a Hazardous Materials Inventory Statement be prepared. This requirement and the requirement for an HMBP can usually be satisfied in a single combined document. San Francisco adopted these articles of the California Fire Code into its municipal code in 1999. The California Fire Code is based on the Federal Fire Code.
- State Building Standard Code, Health and Safety Code Sections 18901 to 18949—Incorporates the UBC, Uniform Fire Code, and Uniform Plumbing Code.
- The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section VIII.
- The American National Standards Institute (ANSI) K61.1.

8.12.3 Affected Environment

The project site is located in the City of San Francisco, adjacent to San Francisco Bay (see Figure 2-1). Land use in the surrounding area (discussed in detail in Subsection 8.4, Land Use) is primarily industrial and commercial with some associated residential. Sensitive receptors within a 3-mile radius of the project site include 70 schools, 48 day care facilities, 22 hospitals or long-term health care facilities, and 49 parks and recreation centers. These receptors are listed in Table 8.12-2 and shown on Figure 8.6-1. The closest of these receptors is the Warm Water Cove Public Access area, a park located approximately 300 feet south of the project site. The nearest school is Daniel Webster Elementary School located approximately 3,000 feet to the northwest. The nearest day care facility is San Francisco Head Start, located approximately 4,000 feet to the west. The nearest hospital/long-term health care facility is the San Francisco General Hospital located approximately 5,300 feet to the west.

The nearest residence is located on Third Street between 22nd and 23rd streets, approximately 600 feet northwest of the project site.

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

Day Care Facilities			
1	San Francisco Head Start	25	Children's Council of San Francisco
2	Friends of Potrero Hill Nursery	26	Olive Street Head Start
3	Love & Learn Nursery School	27	Alfa Da Developmental Center
4	San Francisco Southeast Headstart	28	True Sunshine Pre-School Center
5	Kiddieland Happy Face Place	29	Wind in the Willows Inc.
6	Mission Head Start	30	Noe Valley Nursery School
7	San Francisco Head Start	31	San Francisco School
8	Marin Day Schools	32	Kinderhaven Children's Center
9	Compañeros Del Barrio Pre-School	33	Economic Opportunity Council
10	Lucy Harber Academy	34	Montessori House of Children
11	Marin Day Schools	35	Littlest Angel Prep Pre-School
12	EOC Head Start	36	Audrey L. Smith Development Center Inc.
13	Big City Montessori School	37	Kai Ming Headstart
14	Buena Dia Family School – Preschool	38	Excelsior Cooperative Pre-School
15	Golden Gate Head Start	39	Phoebe Hearst Pre-School
16	Marin Day Schools	40	Twelve Hugs Children's Center
17	YMCA – 44 Montgomery Street #770	41	YMCA – 4080 Mission Street
18	Chinese American International School	42	Fellowship Academy & Pre-School
19	Katherine Michiels School	43	Eben Ezer Family Day Care
20	International Christian School	44	M'Eadd Preparatory Day Care
21	Children's Day School	45	Cyo Mission Day Care
22	Holy Family Day Home	46	Holy Family Day Home Bus Office
23	Little Bear School	47	Laura's Day Care
24	Trevor Martin Montessori School	48	Peppertree Day Care & Pre-School
Schools			
1	John Chin Yehall	36	Cesar Chavez Elementary
2	Chinese Education Elementary Center	37	George R. Mascone Elementary
3	Notre Dame Victories Elementary	38	Saint Peter Elementary
4	San Francisco Chinese Parent Community Elementary	39	Bryant Elementary
5	Commodore Stockton Elementary	40	Buena Vista Annex
6	Cathedral School for Boys	41	Starr King Elementary
7	Redding Elementary	42	Leonard Flynn Elementary
8	Bessie Carmichael Elementary	43	St. Antony Elementary
9	Saint Joseph Elementary	44	Immaculate Conception Elementary

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

10	Sacred Heart Cathedral Prep High School	45	Saint Paul High School
11	John Swett Elementary	46	Mission Education Center
12	Ida B. Wells High School	47	Fairmount Elementary
13	Sacred Heart Grammar Elementary	48	St. John the Evangelist Elementary
14	John Muir Elementary	49	St. John the Evangelist High School
15	French-American International Elementary	50	Paul Revere Elementary
16	French-American International High School	51	Paul Revere Annex
17	First Baptist Church School	52	Thurgood Marshall Academic High School
18	M.C. Kinley Elementary	53	San Francisco Montessori
19	Sanchez Elementary	54	Cornerstone Academy Baptist School
20	Everett Middle School	55	Hilcrest Elementary
21	Mission Dolores Elementary School	56	Bridgemont High School
22	Marshal Elementary	57	Saint Elizabeth Elementary School
23	Mission High School	58	Edward R. Taylor Elementary
24	Saint Charles Borromeo School	59	Martin Luther King Academy Middle School
25	International Studies Academy	60	Saint Paul of the Shipwreck Academy
26	Potrero Middle School	61	El Dorado Elementary
27	Daniel Webster Elementary	62	Philip & Sala Burton High School
28	Harvey Mild Elementary	63	Charles R. Drew Elementary
29	Alvarado Elementary	64	George Washington Carver Elementary
30	Saint Phillip Elementary	65	Gloria B. Davis Middle School
31	Edison Elementary	66	Malcom X Elementary
32	Saint James Elementary	67	James Lick Middle
33	Saint Paul Elementary	68	Immaculate Conception Academy High School
34	Horace Mann Middle	69	Bret B. Harte Elementary
35	Downtown Continuation High School	70	Junipero Serra Elementary School
Hospitals/Long-Term Health Care Facilities			
1	Chinese Hospital	12	Granada Senior Home
2	Saint Francis Memorial	13	Lades of Perpetual Help
3	Davies Medical Center	14	Morning Star
4	San Francisco General Hospital	15	Obdulia's Rest Home
5	Saint Lukes Hospital	16	Richard M. Cohen Residence
6	Sheffield Convalescent Hospital	17	Sunnyside Retirement Hacienda
7	Andrews Boarding & Care Home	18	Synergy LLC
8	Belen's Residential Care Home for the Elderly	19	University Mound Ladies Home
9	Bernal Heights Retirement Home	20	Central Gardens Convalescent Center
10	Coventry Park	21	Nob Hill Healthcare Center

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

11	The Granada Hotel	22	The Sequoias – San Francisco
Parks			
1	Justin Herman Plaza	26	Garfield Square
2	Portsmouth Square	27	Precita
3	Union Square	28	Bernal Heights
4	Yerba Buena Gardens	29	Juri Street
5	South Park	30	Upper Noe Recreation Center
6	South of Market Park	31	Fairmount Plaza
7	Boeddeker Park	32	Billy Goat Hill
8	Jefferson Square	33	Walter Hass
9	Hayward Playground	34	Holly Park
10	Koshland	35	Saint Mary's
11	O'Farrell Street Park	36	Silver Terrace Playground
12	Alamo Square	37	Portola Recreation Center
13	Duboce	38	John Maclaren
14	Corona Heights Playground	39	Bayview Playground
15	Mission Dolores	40	Youngblood Coleman Playground
16	Mission Playground	41	Hilltop
17	Eureka Valley Recreation Center	42	Adams Rogers
18	Folsom	43	India Basin Shoreline Playground
19	Franklin Square	44	Bayview
20	Jackson Playground	45	Gilman
21	Aqua Vista Park	46	3 COM PARK
22	McKinley Square	47	Warm Water Cove Public Access Area
23	Potrero Hill Recreation Center	48	Islais Creek Public Access Area
24	Potrero del Sol	49	Heron's Head Park
25	Rolph Play Ground		

Source: Dames and Moore, 2000.

The area potentially affected by any release of aqueous ammonia in excess of 75 ppm would not extend more than 90 feet eastward from the tank, just over the project fence line, as discussed in Subsection 8.12.5, Offsite Migration Modeling (releases to the north, south, and western boundaries of the SFERP will not exceed a concentration of 5 ppm). This will affect only the existing Potrero PP facility operated by Mirant, which is inaccessible to the general public. Because there are no schools, hospitals, day-care facilities, emergency response facilities or long-term health care facilities located within the area potentially affected by any release of hazardous materials, the figure required by CEC Siting Regulations, Title 20, Division 2, Chapter 5, Appendix B (g) (10) (B) would be equivalent to Figure 8.6-1, which shows the project site and surrounding area on a map at a scale 1:24,000.

8.12.4 Potential Environmental and Human Health Effects

Construction and operation of the project will involve the use of various hazardous materials and one regulated substance. The potential environmental and human health impacts related to the use of these materials are discussed in this section.

8.12.4.1 Construction Phase

The quantities of hazardous materials that will be onsite during construction are small relative to the quantities used during operation. They will be limited to gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. There are no feasible alternatives to vehicle fuels and oils for operating construction equipment. The types of paint required are dictated by the types of equipment and structures that must be coated and by the manufacturers' requirements for coating.

Use of these materials during construction will not present a public health risk because the use would be subject to the requirements of Article 21 of the San Francisco Health Code, described further in Subsection 8.12.8.2.1, and because there is a negligible chance that surface water or groundwater could be affected. The project site is largely composed of impervious surfaces, and all stormwater drains to the City's combined sewer system (see Subsection 8.14, Water Resources). During construction, the contractor will be required to implement control measures including best management practices that prevent sediment and stormwater contamination from spills or leaks, control the amount of runoff from the site, and require proper disposal or recycling of hazardous materials. Implementation of these measures during construction will minimize the potential for release of construction-related fuels and other hazardous materials entering the stormwater and draining to the combined sewer system. Stormwater combined with sewage in the combined sewer system receives treatment as discussed in Subsection 8.14, Water Resources. Treated wastewater from the combined sewer system for eventual discharge into the San Francisco Bay is subject to the requirements of the NPDES permit issued by the San Francisco Bay Regional Water Quality Control Board. Through compliance with these requirements, potential environmental effects from the use of hazardous materials during construction are less than significant. In addition, the hazardous materials used during construction will be registered with the SFDPH in accordance with Article 21 of the San Francisco Public Health Code if threshold quantities of storage are exceeded.

Regulated substances, as defined in California's Health and Safety Code, Section 25531, will not be used during construction of the project. Therefore, no discussion of regulated substances storage or handling is included in this subsection.

8.12.4.2 Operations Phase

Storage locations for the hazardous materials that will be used during operation are described in Table 8.12-3. Table 8.12-4 presents information about these materials, including trade names, chemical names, Chemical Abstract Service (CAS) numbers, maximum quantities onsite, RQs, CalARP TPQs, and status as a Proposition 65 chemical (a chemical known to be carcinogenic or cause reproductive problems in humans). Health hazards and flammability data are summarized for these materials in Table 8.12-5, which also contains information on incompatible chemicals (e.g., sodium hypochlorite and ammonia).

A maximum of approximately 38,815 gallons and 100 pounds of hazardous materials and regulated substances will be stored for the project. Most of the hazardous substances that will be used by the project are required for treatment and laboratory analysis of the cooling water, facility maintenance, and lubrication of equipment, or would be contained within transformers and electrical switches. The only regulated substance that will be used for the project is aqueous ammonia; toxicity characteristics and the exposure level criteria for ammonia are included in Table 8.12-6. Alternatives to the use of the 29 percent solution of aqueous ammonia were considered, as discussed in Section 9 (Alternatives) and no feasible alternatives were identified. The use of ammonia generation technologies (urea to ammonia) are not feasible for this project as these processes require steam to be available on the project site and the SFERP project will not be generating steam. Furthermore, these technologies have not been installed on peaking units. The SFERP facility will store the 29-percent aqueous ammonia solution in a single stationary aboveground storage tank. The capacity of the tank will be approximately 12,000 gallons and the maximum quantity onsite will not exceed approximately 10,000 gallons. The tank will be surrounded by a secondary containment structure capable of holding the full contents of the tank, approximately 665 square feet (38 feet by 17.5 feet). The floor of the secondary containment structure will drain to a 24-inch-diameter drain line that will lead to an underground spill containment vault (14 feet by 18 feet by 6 feet).

Aqueous ammonia will be delivered to the plant by truck transport. The truck loading area will be located within a bermed area adjacent to the storage tank. The floor of the loading area will be sloped to drain into the spill containment vault through an underground 4-inch drain line. The use of 29 percent aqueous ammonia will require approximately 14 deliveries of ammonia per year. Use of lower concentrations of aqueous ammonia would require more frequent delivery but would not significantly reduce the risk of offsite releases. The results of an Offsite Consequences Analysis presented in Subsection 8.12.5 show that release of a 29 percent solution of aqueous ammonia under a worst-case scenario will not cause significant offsite impacts to public health or safety.

If a chemical release were to occur without proper controls in place, the public could be exposed to harmful vapors, and incompatible chemicals could mix, causing vapors that could also potentially have harmful effects. In addition, an uncontrolled release of liquid chemicals could run off and drain into the combined sewer system and potentially degrade water quality. However, the California Fire Code, Articles 79 and 80, includes specific requirements for the safe storage and handling of hazardous materials that would reduce the potential for a release of hazardous materials, and mixing of incompatible materials.

The design of the project will incorporate state-of-the-art chemical storage and handling facilities in compliance with the current California Fire Code and other applicable federal, state, and local regulations as discussed in Subsection 8.12.8.2.1. As discussed in that section, the City will also be required to prepare an HMBP for the storage and handling of hazardous materials at the SFERP site. The plan will incorporate City emergency response procedures for hazardous materials incidents specified in the San Francisco Area Plan for Hazardous Materials Incidents. In accordance with the Aboveground Petroleum Storage Act, the aboveground petroleum storage will also be subject to the Act and an SPCC plan specifying methods to prevent and contain a spill would be prepared as discussed in Subsection 8.12.8.2.3.

TABLE 8.12-3
Storage Location and Use of Hazardous Materials During Project Operation

Chemical	Use	Storage Location	State	Type of Storage
Aqueous Ammonia (29% NH_3 by weight)	Control oxides of nitrogen (NO_x) emissions as part of selective catalytic reduction system	East and adjacent to treated water storage tank	Liquid	Continuously Onsite
Aluminum Sulfate, Sodium Aluminate	Coagulant for plant makeup water	Water treatment building	Liquid	Continuously Onsite
Antiscalant	Prevent scale in reverse osmosis membranes	Water treatment building	Liquid	Continuously Onsite
Citric Acid (50%)	pH control of upstream of reverse osmosis equipment	Wastewater Treatment building	Liquid	Continuously Onsite
Cleaning Chemicals/Detergents	Periodic cleaning	Shop/warehouse area	Liquid	Continuously Onsite
Coagulant Aid Polymer (e.g., NALCO NALCOLYTE 8799)	Coagulant for plant makeup water	Water treatment building	Liquid	Continuously Onsite
Corrosion Inhibitor (NALCO 8305 Plus)	Cooling tower cooling water corrosion inhibitor	Near chiller cooling tower	Liquid	Continuously Onsite
Dispersant (NALCO TRASAR 23263)	Cooling tower cooling water dispersant	Near chiller cooling tower	Liquid	Continuously Onsite
Ferric Chloride or Ferric Sulfate	Coagulant for plant makeup water	Water treatment building	Liquid	Continuously Onsite
Laboratory Reagents	Water/wastewater laboratory analysis	Water treatment building	Liquid and Granular Solid	Continuously Onsite
Synthetic Turbine Lubricating Oil	Lubricate rotating equipment (e.g., gas turbine lube oil systems)	Contained within storage tanks on equipment skids	Liquid	Continuously Onsite
Mineral Generator Lubricating Oil	Lubricate rotating equipment (e.g., generator lube oil systems)	Contained within storage tanks on equipment skids	Liquid	Continuously Onsite
Mineral Transformer Insulating Oil	Transformers/switchyard	Contained within transformers and electrical switches	Liquid	Continuously Onsite
Scale Inhibitors (Polyacrylate)	Cooling tower scale inhibitor	Near chiller cooling towers	Liquid	Continuously Onsite

TABLE 8.12-3
Storage Location and Use of Hazardous Materials During Project Operation

Chemical	Use	Storage Location	State	Type of Storage
Sodium Bisulfite (38-70%, NALCO 7804)	Remove free chlorine in reclaimed water upstream of reverse osmosis system and wastewater treatment	Water treatment building and wastewater treatment building	Liquid	Continuously Onsite
Sodium Bromide (NALCO STABREX ST40)	Cooling tower biocide and process water pretreatment	Near chiller cooling towers and water treatment building	Liquid	Continuously Onsite
Sodium Hydroxide (50% Caustic)	pH control upstream of reverse osmosis equipment and wastewater treatment	Water treatment building and wastewater treatment building	Liquid	Continuously Onsite
Sodium Hypochlorite (10.3 - 12% NaOHCl)	Biocide to treat inlet reclaimed water/ cooling tower biocide and process water pretreatment /and wastewater treatment	Water treatment building/ near chiller cooling tower/ wastewater treatment building	Liquid	Continuously Onsite
Sulfuric Acid (93 - 98%)	Enhance back flush of ultra filter system/ cooling tower cooling water pH control	Water treatment building/ near chiller cooling tower	Liquid	Continuously Onsite

TABLE 8.12-4
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ[a]	RQ of Material as Used Onsite[b]	LaFollette Bill TPQ[c]	Prop 65
Regulated Substances							
Aqueous Ammonia (29% solution)	Ammonium Hydroxide	1336-21-6 (for NH_3–H_2O)	10,000 gal.	100 lb	500 lb	500 lb	No
Hazardous Materials							
Aluminum Sulfate[d]	Aluminum Sulfate	10043-01-3	800 gal.	5,000 lb	5,000 lb	[e]	No
Sodium Aluminate[d]	Sodium Aluminate	1302-42-7	400 gal.	[e]	[e]	[e]	No
Antiscalant	Anti-scalant	None	200 gal.	[e]	[e]	[e]	No
Citric Acid	Citric Acid (50 percent)	77-92-9	100 gal.	[e]	[e]	[e]	No
Cleaning Chemicals/Detergents	Various	None	20 gal.	[e]	[e]	[e]	No
Coagulant Aid Polymer (e.g. NALCO NALCOLYTE 8799)	Sodium Chloride	7647-14-5	400 gal.	[e]	[e]	[e]	No
	Polyquaternary Amine	20507700000-5062P		[e]	[e]	[e]	
Corrosion Inhibitor (NALCO 8305 Plus)	Cooling tower cooling water corrosion inhibitor	None	200 gal.	[e]	[e]	[e]	No
Dispersant (NALCO TRASAR 23263)	Cooling tower cooling water dispersant	64665-57-2	200 gal.	[e]	[e]	[e]	No
Ferric Chloride[d]	Ferric Chloride	7705-08-0	400 gal.	1,000 lb	1,000 lb	[e]	No
Ferric Sulfate[d]	Ferric Sulfate	10028-22-5	400 gal.	1,000 lb	1,000 lb	[e]	No
Laboratory Reagents (liquid)	Various	None	20 gal.	[e]	[e]	[e]	No
Laboratory Reagents (solid)	Various	None	100 lb	[e]	[e]	[e]	No
Synthetic Turbine Lubrication Oil	Oil	None	560 gal.	42 gal.[f]	[g]	[e]	Yes
Mineral Generator Lubrication Oil	Oil	None	1,570 gal.	42 gal.[f]	[g]	[e]	Yes

TABLE 8.12-4
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ[a]	RQ of Material as Used Onsite[b]	LaFollette Bill TPQ[c]	Prop 65
Mineral Transformer Insulating Oil	Oil	8012-95-1	21,000 gal.	42 gal.[f]	[g]	[e]	Yes
Scale Inhibitors (various)	Polyacrylate	Various	400 gal.	[e]	[e]	[e]	No
Sodium Bisulfite (NALCO 7804)	Sodium Bisulfite (38 to 70 percent)	7631-90-5	450 gal.	5,000 lb	7,143 lb	[e]	No
Sodium Bromide (NALCO STABREX ST40)	Sodium Hydroxide (1 to 5 percent)	1310-73-2	200 gal.	1,000 lb	20,000 lb	[e]	No
Sodium hydroxide (caustic)	Sodium Hydroxide (50 percent)	1310-73-2	425 gal.	1,000 lb	20,000 lb	[e]	No
Sodium Hypochlorite (Bleach)	Sodium Hypochlorite (10.3-12 percent)	7681-52-9	870 gal.	100 lb	1,000 lb	[e]	No
Sulfuric Acid	Sulfuric Acid (93 – 98 percent)	7664-93-0	400 gal.	1,000 lb	1,075 lb	[e]	No

[a] Reportable quantity for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [Ref. 40 CFR 302, Table 302.4]. Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.

[b] Reportable quantity for materials as used onsite. Since some of the hazardous materials are mixtures that contain only a percentage of a reportable chemical, the reportable quantity of the mixture can be different than for a pure chemical. For example, if a material only contains 10 percent of a reportable chemical and the RQ is 100 lb, the reportable quantity for that material would be (100 lb)/(10%) = 1,000 lb.

[c] Threshold Planning Quantity [Ref. 40 CFR Part 355, Appendix A]. If quantities of extremely hazardous materials equal to or greater than TPQ are handled or stored, they must be registered with the local Administering Agency.

[d] Some of the chemicals have alternatives (See Table 8.12-1), thus the maximum quantity stored onsite can be zero if an alternative chemical is being used.

[e] No reporting requirement. Chemical has no listed RQ or TPQ.

[f] State reportable quantity for oil spills that will reach California state waters [Ref. CA Water Code Section 13272(f)].

[g] Per the California Regional Water Quality Control Board, Region 2, they would like all oil spills to surface water reported, even for less than the state reportable quantity of 42 gal.

TABLE 8.12-5
Toxicity, Reactivity, and Flammability of Hazardous and Regulated Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Regulated Substances				
Aqueous Ammonia	Liquid, vapor is colorless gas with pungent odor	Corrosive: Irritation to permanent damage from inhalation, ingestion, and skin contact	Acids, halogens (e.g., chlorine), strong oxidizers, salts of silver and zinc	Liquid is incombustible; vapor is combustible, but difficult to burn
Hazardous Materials				
Aluminum Sulfate	Liquid	Toxic: Moderately toxic by ingestion	None	Nonflammable
Sodium Aluminate	Straw-colored liquid	Strong irritant to tissue	Acids and strong oxidizing agents	Nonflammable
Antiscalant	Amber liquid	May cause slight irritation to the skin and moderate irrigation to the eyes	None	Nonflammable
Citric Acid	Colorless translucent crystals	Skin and mucous membrane irritant and severe eye irritant	Strong bases and oxidizing agents	Nonflammable
Cleaning Chemicals/Detergents	Liquid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Coagulant Aid Polymer (e.g. NALCO NALCOLYTE 8799)	Light yellow liquid	May cause irritation to skin and eyes with prolonged contact	Strong oxidizers	Nonflammable
Corrosion Inhibitor (NALCO 8305 Plus)	Light yellow liquid, sweet organic odor	Irritant to eyes, skin, and respiratory tract	Strong oxidizers, strong acids, and reactive metals	Nonflammable
Dispersant (NALCO TRASAR 23263)	Clear amber liquid	None	None	Nonflammable
Ferric Chloride	Clear, yellow-orange liquid	Corrosive: Causes burns to eyes and skin; ingestion may cause stomach pain, nausea, vomiting, shock, and diarrhea	Heat and evaporation	Nonflammable

TABLE 8.12-5
Toxicity, Reactivity, and Flammability of Hazardous and Regulated Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Ferric Sulfate	Dark reddish-brown solution with mild odor	Corrosive: May cause irritation to mucous membranes, respiratory tract and lung tissue if inhaled or burns to skin and eyes; ingestion can cause stomach irritation, digestive tract burns, liver cirrhosis and fibrosis of pancreas	Cast iron/bronze, brass, 304ss, hastelloy B, copper and alloys, galvanized steel, aluminum, paints, enamels, and concrete	Nonflammable
Laboratory Reagents	Liquid and solid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Lubrication Oil	Oily, dark liquid	Hazardous if ingested	Sodium hypochlorite	Flammable
Mineral Insulating Oil	Oily, clear liquid	Minor health hazard	Sodium hypochlorite	Can be combustible, depending on manufacturer
Scale Inhibitors (Polyacrylate)	Yellow green liquid	Corrosive and Toxic: Slight to moderate toxicity; irritation to skin and eyes	Strong acids	Nonflammable
Sodium Bisulfite	Yellow liquid	Corrosive: Irritation to eyes, skin, and lungs; may be harmful if digested	Strong acids and strong oxidizing agents	Nonflammable
Sodium Bromide	White crystals, granules, or powder; odorless	Causes irritation to skin, eyes, and respiratory tract; can cause damage to central nervous system if ingested	Acids, alkaloidal and heavy metal salts, oxidizers, and bromine trifluoride	Nonflammable
Sodium Hydroxide	Clear yellow liquid	Corrosive: Irritant to tissue in presence of moisture; strong irritant to tissue by ingestion	Water, acids, organic halogens, some metals	Nonflammable
Sodium Hypochlorite (Bleach)	Pale green; sweet, disagreeable odor. Usually in solution with H_2O or sodium hydroxide	Corrosive and Toxic: Toxic by ingestion; strong irritant to tissue	Ammonia and organic materials	Fire risk when in contact with organic materials
Sulfuric Acid	Colorless, dense, oily liquid	Strongly Corrosive: Strong irritant to all tissue; minor burns to permanent damage to tissue	Organic materials, chlorates, carbides, fulminates, metals in powdered form; reacts violently with water	Nonflammable

Data were obtained from Material Safety Data Sheets (MSDSs) and Lewis, 1991.

* Per Department of Transportation regulations, under 49 CFR 173: "Flammable" liquids have a flash point less than or equal to 141° F; "Combustible" liquids have a flash point greater than 141° F.

TABLE 8.12-6
Toxic Effects and Exposure Levels of Regulated Substances

Name	Toxic Effects	Exposure Levels-Pure NH_3
Aqueous Ammonia (29 percent solution)	Toxic effects for contact with pure liquid or vapor causes eye, nose, and throat irritation, skin burns, and vesiculation. Ingestion or inhalation causes burning pain in mouth, throat, stomach, and thorax, constriction of thorax, and coughing followed by vomiting blood, breathing difficulties, convulsions, and shock. Other symptoms include dyspnea, bronchospasms, pulmonary edema, and pink frothy sputum. Contact or inhalation overexposure can cause burns of the skin and mucous membranes, headache, salivation, nausea, and vomiting. Other symptoms include labored breathing, bloody mucous discharge, bronchitis, laryngitis, hemmoptysis, and pneumonitis. Damage to eyes may be permanent, including ulceration of conjunctiva and cornea and corneal and lenticular opacities.	Occupational Exposures: PEL = 35 mg/m^3 OSHA TLV = 18 mg/m^3 ACGIH TWA = 25 mg/m^3 NIOSH STEL = 35 mg/m^3 Hazardous Concentrations: IDLH = 500 ppm LD_{50} = 350 mg/kg – oral, rat ingestion of 3 to 4 ml may be fatal Sensitive Receptors: ERPG-1 = 25 ppm ERPG-2 = 200 ppm ERPG-3 = 1,000 ppm

ACGIH	American Conference of Government Industrial Hygienists
ERPG	Emergency Response Planning Guideline
ERPG-1	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects
ERPG-2	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without developing irreversible or serious health effects
ERPG-3	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing life-threatening health effects
IDLH	Immediately dangerous to life and health
LD_{50}	Dose lethal to 50 percent of those tested
LDLO	Lowest published lethal dose
mg/kg	Milligrams per kilogram
mg/m^3	Milligrams per cubic meter
NIOSH	National Institute of Occupational Safety and Health
PEL	Occupational Safety and Health Administration (OSHA) permissible exposure limit for 8-hr workday
ppm	parts per million
STEL	Short-term exposure limit, 15-min. exposure
TCLO	Lowest published toxic concentration
TLV	ACGIH threshold limit value for 8-hr workday
TWA	NIOSH time-weighted average for 8-hr workday

Because of its classification as a regulated substance, an accidental release of the 29 percent aqueous ammonia could present the most likely potential for effects on the environment and/or human health of all the chemicals used at the site. Pure ammonia (NH_3) is a volatile, regulated substance that is very soluble in water. Aqueous ammonia consists of a solution of ammonia and water. If the aqueous ammonia solution were to leak or be released without proper controls, the ammonia in solution could escape or evaporate as a gas into the atmosphere.

Ammonia gas can be toxic to humans at sufficient concentrations. Potential toxic effects of ammonia and acceptable exposure levels are summarized in Table 8.12-6. The odor threshold of ammonia is about 5 ppm, and minor irritation of the nose and throat will occur at 30 to 50 ppm. Ammonia concentrations greater than 140 ppm will cause detectable effects on lung function even for short-term exposures (0.5 to 2 hours). At higher concentrations of 700 to 1,700 ppm, ammonia gas will cause severe effects; death occurs at concentrations of 2,500 to 6,000 ppm (Smyth, 1956).

Storage and use of ammonia would be subject to the requirements of the California Fire Code, Article 80, described in Subsection 8.12.8.2.1, as well as the CalARP, described in Subsection

8.12.8.2.3. Article 80 of the California Fire Code contains specific requirements for control of liquid and gaseous releases of hazardous materials. Secondary containment in the form of an underground spill containment vault, as described earlier in Subsection 8.12.4.2, will be provided for the ammonia storage tank and loading area. In addition, the facility will be required to prepare an RMP in accordance with the CalARP, further specifying safe handling procedures for the ammonia as well as emergency response procedures in the event of an accidental release.

Sulfuric acid is also identified as a regulated substance under the CalARP program, but only if it is concentrated with greater than 100 pounds of sulfur trioxide, if it meets the definition of oleum, or if it is stored in a container with flammable hydrocarbons. The sulfuric acid that will be used at the facility meets none of these criteria. Therefore, sulfuric acid is not subject to CalARP requirements.

With construction in accordance with applicable laws and regulations, provision of secondary containment for storage and loading facilities, preparation of a HMBP, preparation of a SPCC plan, and preparation of an RMP, discussed in Subsections 8.12.8.2.1 through 8.12.8.2.3, potential public health and environmental impacts related to the use of hazardous materials and regulated substances are less than significant.

8.12.5 Offsite Migration Modeling

Because there is human activity in the vicinity of the proposed site, a vulnerability analysis was performed to assess the risk to humans from the site if a spill or rupture of the aqueous ammonia storage tank were to occur. Dispersion modeling was conducted using the SLAB numerical dispersion model (LLNL, 1990).

The worst-case accidental release scenario assumed the aqueous ammonia storage tank was punctured and the entire contents was spilled into a catch basin or bermed area located beneath the tank. An initial ammonia emission rate for an evaporating pool of 29 percent aqueous ammonia solution was calculated pursuant to the guidance given in *RMP Offsite Consequence Analysis Guidance, EPA, April 1999* and using the "evaporation calculator" provided by the National Oceanic and Atmospheric Administration (http://response.restoration.noaa.gov/ cameo/evapcalc/evap.html#). Release rates for ammonia vapor from an evaporating 29-percent solution of aqueous ammonia were calculated assuming mass transfer of ammonia across the liquid surface occurs according to principles of heat transfer by natural convection. The ammonia release rate was calculated using the evaporation calculator, meteorological data listed below and the dimensions of the secondary containment area. The offsite consequence analysis is provided as Appendix 8.12A.

An initial ammonia evaporation rate was calculated and assumed to occur for at least one hour. For concentrated solutions, the initial evaporation rate is substantially higher than the rate averaged over time periods of a few minutes or more since the concentration of the solution immediately begins to decrease as evaporation begins. Parameters used to calculate the initial ammonia emission rate include an atmospheric stability classification of "F," a wind speed of 1.5 meters/second and a temperature of 97 degrees Fahrenheit (°F). Using these parameters, the ammonia plume was predicted to extend approximately 26.19 meters (86 feet) at ground level from the ammonia storage tank at a concentration of 200 ppm. At a

concentration of 75 ppm, the distance was 27.22 meters (<90 feet) from the tank at ground level. The assumptions used in this analysis include the following:

- A total mass release of 3,413 pounds of ammonia is assumed to occur over 1 hour, representing an evaporating pool of 10,000 gallons of a 29 percent ammonia solution
- An ammonia storage temperature of 97°F (highest temperature recorded at San Francisco International Airport [SFO] over the past 3 years)
- A diked area of 665 square feet (17.5 feet wide by 38 feet long)
- A roughness length of 0.4 meters, representing an urban, industrial area.

Based on this conservative modeling analysis, the worst case accident is not expected to result in an offsite release greater than 5 ppm to the north, south, or west of the site. Thus, offsite concentrations in publicly accessible areas will be below 75 ppm. Offsite concentrations of 300 ppm could occur to the east of the site on the existing Mirant private property. Since the general public will not be exposed to ammonia concentrations above 75 ppm during a worst-case release scenario, the storage of aqueous ammonia onsite will not pose a significant risk to the public.

8.12.6 Fire and Explosion Risk

Table 8.12-5 describes the flammability for the hazardous materials that will be onsite. With the exception of ammonia and lubricating oils, all hazardous materials are nonflammable. Article 80 of the California Fire Code requires all hazardous materials storage areas to be equipped with a fire extinguishing system and also requires ventilation for all enclosed hazardous material storage areas.

Aqueous ammonia, which constitutes the largest quantity of hazardous materials onsite (except for the oil contained in the equipment) and is the only chemical classified as a regulated substance, is incombustible in its liquid state. Under normal storage conditions, ammonia would not evaporate to the atmosphere because it would be contained within a totally enclosed system equipped with ventilation as required by Article 80 of the California Fire Code and described in Subsection 8.12.8.2.2. In the unlikely event that a release were to occur, ammonia could evaporate as a vapor. Ammonia vapor is combustible only within a narrow range of concentrations in air. The evaporation rate of aqueous ammonia is sufficiently low that the lower explosion limit (LEL) will not be reached. The lubrication oil is flammable. In accordance with Article 80 of the California Fire Code, the storage area for the lubrication oil would be equipped with a fire extinguishing system and the lubrication oil would be handled in accordance with an HMBP approved by the SFDPH and the CEC. With proper storage and handling of flammable materials in accordance with the California Fire Code and the site-specific HMBP, the risk of fire and explosion at the generating facility would be minimal.

The natural gas fuel the facility will use is flammable and could leak from the pipeline that brings the gas from the main PG&E distribution pipeline. Natural gas is composed mostly of methane, but also may contain ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless, and is lighter than air. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and explosion if an accidental release were to

occur. However, the risk of a fire and/or explosion would be reduced through compliance with applicable codes, regulations, and industry design/construction standards.

The federal safety and operating requirements for natural gas pipelines are contained in Title 49 of the Code of Federal Regulations, Parts 190 through 192. These requirements vary according to population density and land use; the pipeline classes are defined as follows:

- Class 1 includes pipelines in locations with 10 or fewer buildings intended for human occupancy.
- Class 2 includes pipelines in locations with more than 10, but fewer than 46 buildings intended for human occupancy.
- Class 3 includes pipelines in locations with more than 46 buildings intended for human occupancy, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days per week for 10 weeks in any 12-month period.
- Class 4 includes pipelines in locations where buildings with 4 or more stories aboveground are prevalent.

The project's pipeline will be designed to meet Class 3 service and will meet California Public Utilities Commission General Order 112-D and 58-A standards, in addition to the federal requirements for gas pipeline construction and safety.

The closest San Francisco fire station is Station No. 37 at 789 Wisconsin Street. The station is approximately 0.6 mile away and would provide the first response to a fire at the project site. If hazardous materials were involved in the incident, the San Francisco Fire Department Hazardous Materials Team located in Station No. 36 at 109 Oak Street would also be called to respond. This station is located approximately 2 miles from the project site. In addition, the San Francisco Environmental Health Section of the Department of Public Health provides emergency responders that serve as technical consultants for the Fire Department's Hazardous Materials Team.

8.12.7 Cumulative Impacts

A cumulative impact of the use and storage of hazardous materials could occur if there were a simultaneous release of a chemical that could migrate offsite from two or more sites. Potentially, the two or more migrating releases could combine, thereby posing a greater threat to the offsite population than a single release from any single site. Ammonia is the only hazardous material that will be used during project operation that would be stored in sufficient quantity onsite to have the potential to cause such a cumulative impact.

As discussed in Subsection 8.12.5, an ammonia plume that could occur as a result of a catastrophic release from the ammonia tank would be expected to extend a maximum of 90 feet eastward from the ammonia tank, just over the project fence onto Potrero PP. To determine if other facilities have the potential to result in cumulative release of chemicals, the facilities that have filed an RMP with the SFDPH were identified and are summarized in Table 8.12-7. These facilities with completed RMPs would be considered to have the greatest potential to cause a cumulative impact in the event of a simultaneous release. As shown in Table 8.12-7, the identified facilities all handle ammonia and are located a minimum of

0.5 mile from the project site (with the exception of the Potrero PP adjacent to the site). Therefore, these facilities are located outside of the area where, if simultaneous releases were to occur, no cumulative impacts would be expected as a result of a release from one of these facilities and the project.

TABLE 8.12-7
Facilities in San Francisco That Have Filed a Risk Management Plan

Site Name	Address	Regulated Substance	Approximate Distance from Project Site, Miles
UCSF/CUP Containment Structure	2 Medical Center Way	Ammonia	4
C.J. Figone Cold Storage	420 17th Street	Ammonia	0.5
Dean's Services	1600 Donner Avenue	Ammonia	2.4
Anchor Brewing Co.	1705 Mariposa Street	Ammonia	0.8
Growers Refrigeration, Inc.	2050 Galvez Avenue	Ammonia	0.9
Potrero PP (in progress)	1201 Illinois Street	Ammonia	0.1*

Sources: SFDPH, 2003
* The Potrero PP has not yet filed an RMP with the San Francisco Department of Public Health, but intends to do so.

The Potrero PP, located 700 feet to the east of the project, is in the process of completing an RMP for ammonia. Until the Potrero PP RMP has been filed, the cumulative impacts of a simultaneous release from the SFERP and Potrero PP tanks cannot be evaluated.

8.12.8 Proposed Mitigation Measures

The following subsections present measures included in the project to mitigate potential public health and environmental impacts of handling hazardous materials and regulated substances during construction and operation.

8.12.8.1 Construction Phase

As discussed in Subsection 8.12.4, the hazardous materials that would be used during construction present a relatively low public health risk, but could contaminate surface water or groundwater if a release occurred. Registering these hazardous materials in accordance with Article 21 of the San Francisco Health Code and use of best management practices would reduce the potential for the release of construction-related fuels and other hazardous materials to stormwater and receiving waters as discussed in Subsection 8.14, Water Resources. Best management practices prevent sediment and stormwater contamination from spills or leaks, control the amount of runoff from the site, and require proper disposal or recycling of hazardous materials.

Service personnel will follow general industry health, safety, and environmental standards for filling and servicing construction equipment and vehicles. The standards are designed to reduce the potential for incidents involving the hazardous materials. They include the following:

- Refueling and maintenance of vehicles and equipment will occur only in designated areas that are either bermed or covered with concrete or asphalt to control potential spills.
- Vehicle and equipment service and maintenance will be conducted only by authorized personnel.

- Refueling will be conducted only with approved pumps, hoses, and nozzles.
- Catch-pans will be placed under equipment to catch potential spills during servicing.
- All disconnected hoses will be placed in containers to collect residual fuel from the hose.
- Vehicle engines will be shut down during refueling.
- No smoking, open flames, or welding will be allowed in refueling or service areas.
- Refueling will be performed away from bodies of water to prevent contamination of water in the event of a leak or spill.
- When refueling is completed, the service truck will leave the project site.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents.
- Should a spill contaminate soil, the soil will be put in containers and disposed of as appropriate. All containers used to store hazardous materials will be inspected at least once per week for signs of leaking or failure. All maintenance and refueling areas will be inspected monthly. Results of inspections will be recorded in a logbook that will be maintained onsite.

In the unlikely event of a spill, the spill may need to be reported to the appropriate regulatory agencies and cleanup of contaminated soil could be required. Small spills will be contained and cleaned up immediately by trained, onsite personnel. Larger spills will be reported via emergency phone numbers to obtain help from offsite containment and cleanup crews. All personnel working on the project during the construction phase will be trained in handling hazardous materials and the dangers associated with hazardous materials. An onsite health and safety person will be designated to implement health and safety guidelines and to contact emergency response personnel and the local hospital, if necessary.

If there is a large spill from a service or refueling truck, contaminated soil will be placed into barrels or trucks by service personnel for offsite disposal at an appropriate facility in accordance with law. If a spill involves hazardous materials equal to or greater than the specific reportable quantity (25 gallons for petroleum products), all federal, state, and local reporting requirements will be followed. In the event of a fire or injury, the local fire department will be called (City of San Francisco Station No. 37).

8.12.8.2 Operation Phase

During facility operation, various hazardous materials and one regulated substance will be stored onsite. Tables 8.12-5 and 8.12-6 describe the toxicity of the regulated substance and hazardous materials. Listed below are mitigation measures for minimizing the public health risks associated with hazardous material and regulated substance handling during facility operation.

8.12.8.2.1 Hazardous Materials. All hazardous materials will be handled and stored in accordance with applicable codes and regulations specified in Subsection 8.12.2. Specific requirements of the California Fire Code that reduce the risk of fire or the potential for a release of hazardous materials that could affect public health or the environment include:

- Provision of an automatic sprinkler system for indoor hazardous material storage areas.

- Provision of an exhaust system for indoor hazardous material storage areas.
- Separation of incompatible materials by isolating them from each other with a noncombustible partition.
- Spill control in all storage, handling, and dispensing areas.
- Separate secondary containment for each chemical storage system. The secondary containment is required to hold the entire contents of the tank plus the volume of water for the fire suppression system that could be used for fire protection for a period of 20 minutes in the event of a catastrophic spill.

In addition, an HMBP is required by CCR Title 19 and the Health and Safety Code (Section 25504) as well as Article 21 of the San Francisco Health Code, which incorporates state requirements for hazardous materials handling and specifies some more stringent requirements. In accordance with these regulations, the HMBP will include an inventory and location map of hazardous materials onsite and an emergency response plan for hazardous materials incidents. Specific topics to be covered in the plan include:

- Facility identification
- Emergency contacts
- Chemical inventory information (for every hazardous material)
- Site map
- Emergency notification data
- Procedures to control actual or threatened releases
- Emergency response procedures
- Training procedures
- Certification

The HMBP will be filed with the SFDPH and updated annually in accordance with applicable regulations. The SFDPH will ensure review by and distribution to other potentially affected agencies including the San Francisco Fire Department.

In accordance with emergency response procedures specified in the HMBP, designated personnel will be trained as members of a plant hazardous material response team, and team members will receive the first responder and hazardous material technical training to be developed in the HMBP, including training in appropriate methods to mitigate and control accidental spills. However, in the event of a chemical emergency, plant personnel will defer to the San Francisco Hazardous Materials Team at San Francisco Fire Station No. 36 (109 Oak Street), approximately 2 miles away.

8.12.8.2.2 Aqueous Ammonia. Aqueous ammonia will be used in an selective catalytic reduction (SCR) process to control NO_x emissions created in the combustion chambers of the combustion turbines. The SCR system will include a reactor chamber, catalyst modules, an ammonia storage system, and an ammonia injection system. The aqueous ammonia, stored as a liquid solution of 29 percent ammonia and 71 percent water, will be injected into the reactor chamber. The rate of injection will be controlled by a monitoring system that uses sensors to determine the correct quantity of ammonia to feed to the reactor chamber. The reactor chamber will contain the catalyst modules and be located where the catalyst will be most effective at the desired levels of plant operation.

Approximately once every 9 days during full operation (or a maximum of 14 deliveries per year), one 6,500-gallon tanker truck will deliver aqueous ammonia to the site. The ammonia will be stored in an aboveground stationary tank with a 12,000-gallon capacity contained within a secondary containment system, as required by the Uniform Fire Code. This containment system includes a concrete containment area surrounding the tank. The containment area will have a sloped floor, which will direct any liquid to a 24-inch drain centered below the tank. This drain will lead to a covered sump. The aqueous ammonia storage tank will be equipped with continuous tank level monitors, automated leak detection system, temperature and pressure monitors and alarms, and excess flow and emergency block valves.

Ammonia is a regulated substance under the federal Clean Air Act pursuant to 40 CFR 68 (Subpart G) and the CalARP pursuant to Health and Safety Code Sections 25331 through 25543.3. The California program is similar to the federal program but is more stringent in some areas.

In accordance with CalARP regulations, a RMP will be required in addition to the HMBP described above. The RMP includes a hazard assessment to evaluate the potential effects of an accidental release, a program for preventing an accidental release, and a program for responding to an accidental release. The specific components of an RMP include:

- Description of the facility
- Accident history of the facility
- History of equipment used at the facility
- Design and operation of the facility
- Site map(s) of the facility
- Piping and instrument diagrams of the facility
- Seismic analysis
- Hazard and operability study
- Prevention program
- Consequence analysis
- Offsite consequence analysis
- Emergency response
- Auditing and inspection
- Record keeping
- Training
- Certification

The RMP is prepared interactively with the SFDPH and the public is provided with an opportunity for review and input to the plan as part of the public hearing/notification requirements of Article 21A of the San Francisco Health Code. The RMP will be filed with and administered by the SFDPH. This department will ensure review by and distribution to other potentially affected agencies including the San Francisco Fire Department and Bay Area Air Quality Management District.

A Process Safety Management Plan (PSM) will not be required under OSHA, because the OSHA regulations apply only to aqueous ammonia solutions above 44 percent (29 CFR Part 199). The requirements for a PSM are very similar to those for an RMP although an

offsite consequences analysis is not required for the PSM. The RMP may be sufficient to also meet the requirements of a PSM plan, if required.

8.12.8.2.3 Petroleum Products. Federal and California regulations require a SPCC plan if petroleum products above certain quantities are stored. Both federal and state laws apply only to petroleum products that might be discharged to navigable waters. If stored quantities are equal to or greater than 660 gallons for a single container, or equal to or greater than 1,320 gallons total (including ASTs, oil-filled equipment, and drums), an SPCC must be prepared. Since the facility will store more than 1,320 gallons of petroleum products, an SPCC plan will be prepared.

8.12.8.2.4 Transportation/Delivery of Hazardous Materials and Regulated Substances. Hazardous materials and one regulated substance will be delivered periodically to the facility. As discussed in Subsection 8.10, Traffic and Transportation, transportation of hazardous materials will comply with all Department of Transportation (Caltrans), USEPA, California Department of Toxic Substances Control (DTSC), CHP, and California State Fire Marshal regulations. Under the California Vehicle Code, the CHP has the authority to adopt regulations for transporting hazardous materials in California. The CHP can issue permits and specify the route for hazardous material delivery. Aqueous ammonia, the only regulated substance that will be delivered to the facility, will be transported in accordance with Vehicle Code Section 32100.5, which regulates the transportation of hazardous materials that pose an inhalation hazard. In addition, ammonia will only be transported along approved transportation routes. The approved route would be from Interstate 280 to Cesar Chavez Street, to Third Street, to 23rd Street, to the project site.

8.12.8.3 Monitoring

In accordance with applicable federal, state, and local regulations, site personnel would regularly inspect all hazardous materials handling facilities for compliance with applicable regulations and would ensure that any deficiencies were promptly repaired. In addition, the facility would be subject to regular inspections by the SFDPH and San Francisco Fire Department, which would ensure compliance with appropriate regulatory requirements for hazardous materials and regulated substances handling.

8.12.9 Involved Agencies and Agency Contacts

Several agencies regulate hazardous materials and they will be involved in regulating the hazardous materials stored and used at the facility. At the federal level, the USEPA will be involved; at the state level, the California Environmental Protection Agency (CalEPA) will be involved. However, local agencies are primarily responsible for enforcing hazardous materials laws. For the project, the local agencies involved will be the SFDPH and San Francisco Fire Department, Fire Prevention Bureau. The persons to contact are shown in Table 8.12-8.

TABLE 8.12-8
Agency Contacts

Type Material	Agency	Contact	Title	Telephone
Storage of Hazardous Materials and Regulated Substances	San Francisco Department of Public Health	Sue Cone	Program Manager	(415) 252-3991
Storage of Hazardous Materials and Regulated Substances	San Francisco Fire Department	Mary Boucher	Fire Inspector	(415) 558-3306
Hazardous Materials Response	San Francisco Fire Department	Battalion Chief Barden	Battalion 2 Chief	(415) 558-3236

8.12.10 Permits Required and Permit Schedule

The SFDPH will require an HMBP for the storage of hazardous materials during construction and operation as well as an RMP for the storage of regulated substances. In addition, the San Francisco Fire Department could require the following permits related to construction of the chemical handling facilities and hazardous materials use during operation:

- **Building Permit.** This permit is required for construction of the aboveground storage tanks.
- **Fire Permit.** This permit is required for installation of the aboveground storage tanks.
- **Hazardous Materials Use and Storage Permit.** This permit is required for the use of hazardous materials during operation.

8.12.11 References

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National Oceanic and Atmospheric Administration (NOAA). 2002. Evaporation Calculator, CAMEO Toolkit. http://response.restoration.noaa.gov/cameo/evapcalc/evap.html#.

San Francisco Department of Public Health (SFDPH). 2003. List of Regulated Substances Facilities. Emailed to Mary McDonald of Orion Environmental Associates on December 4, 2003.

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SUBSECTION 8.13

Waste Management

8.13 Waste Management

8.13.1 Introduction

This subsection evaluates the potential effects on human health and the environment from nonhazardous and hazardous waste generated at the San Francisco Energy Reliability Project (SFERP) and from potential hazardous and nonhazardous wastes in the soil and groundwater as a result of historic site activities. Subsection 8.13.2 presents laws, ordinances, regulations, and standards (LORS) that apply to wastes that will be generated during construction and operation of the project as well as to remediation and disposal of contaminated soil and groundwater. Subsection 8.13.3 describes the current condition of the proposed site and plans for remediation of existing soil and groundwater contamination within the project area. Subsection 8.13.4 describes the wastes that are expected to be generated by the project. Subsection 8.13.5 describes recycling goals and waste disposal sites for nonhazardous and hazardous waste.

Subsection 8.13.6 describes methods that will be employed to manage the waste generated during construction and operation of the SFERP, as well as potential wastes in the soil and groundwater. Section 8.13.6 also discusses how the potential impacts of such wastes on the environment will be mitigated. Subsection 8.13.7 discusses cumulative impacts. Subsection 8.13.8 describes monitoring that would be conducted to ensure that recycling goals are met, wastes are handled and disposed of in a legally appropriate manner, and that there is no unacceptable exposure to hazardous wastes in the soil and groundwater during operation. Subsection 8.13.9 describes agencies that have jurisdiction over the generated waste and specifies the contact person in those agencies. Subsection 8.13.10 describes permits required for generated waste and a schedule for obtaining those permits, and Subsection 8.13.11 provides the references used to prepare this subsection.

8.13.2 Laws, Ordinances, Regulations, and Standards

At SFERP, nonhazardous and hazardous waste handling will be governed by federal, state, and local laws, ordinances, regulations, and standards. Applicable laws and regulations address proper waste handling, storage, and disposal practices to protect the environment from contamination and to protect facility workers and the surrounding community from exposure to nonhazardous and hazardous waste. Table 8.13-1 presents a summary of the LORS applicable to waste handling at the SFERP facility. In addition, there is known soil and groundwater contamination within the project site that will require mitigation prior to (or during) construction of the project. The local ordinance applicable to this mitigation is also summarized in Table 8.13-1.

8.13.2.1 Federal

The federal statute that regulates both nonhazardous and hazardous waste is the Resource Conservation and Recovery Act (RCRA) contained in Title 42 of the United States Code (USC) Section 6901, et seq. RCRA's implementing regulations are contained in Title 40 of the Code of Federal Regulations, Section 260, et seq. Subtitle D assigns responsibility for the regulation of nonhazardous waste to the states; federal involvement is limited to establishing minimum criteria that prescribe the best practicable controls and monitoring

TABLE 8.13-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Waste Management

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
Federal		
Resource Conservation and Recovery Act (RCRA) Subtitle D (Pub. L. 94-580, 42 U.S.C. 6901 et seq.) Solid Waste (40 CFR 239-259)	Regulates design and operation of solid waste landfills where nonhazardous wastes from construction and operation of the SFERP that are not recycled will be disposed.	Solid waste will be collected and disposed of by a collection company at a solid waste landfill that is permitted in conformance with Subtitle D (Subsections 8.13.6.1.2, 8.13.6.2.1, and 8.13.7).
RCRA Subtitle C (Pub. L. 94-580, 42 U.S.C. 6921 et seq.) Hazardous Waste (40 CFR 260-299)	Controls storage, transportation, treatment, and disposal of hazardous waste.	Contractors will handle hazardous waste in conformance with Subtitle C (Subsections 8.13.6.1.4, 8.13.6.2.2, and 8.13.7).
Clean Water Act (CWA) (33 U.S.C. 1251 et seq.) Water Programs (40 CFR 100-149)	Controls discharge of wastewater to the surface waters of the U.S.	Industrial and sanitary wastewater will be discharged to the San Francisco combined sewer system (Subsections 8.13.6.1.3 and 8.13.6.2.1).
State		
California Integrated Waste Management Act (CIWMA) (California Public Resources Code, Section 40000 et seq.) California Integrated Waste Management Board (14 CCR 17000 et seq.)	Controls solid waste collectors, recyclers, and depositors. Mandates local jurisdictions to meet diversion, or recycling, goals of 25 percent by 1995 and 50 percent by the year 2000.	Solid waste will be collected and recycled or disposed of by a collection company in conformance with the CIWMA (Subsections 8.13.6.1.3, 8.13.6.2.1, and 8.13.7).
Hazardous Waste Control Law (HWCL) (California Health and Safety Code, Chapter 6.5)	Controls storage, transportation, treatment, and disposal of hazardous waste.	Hazardous waste will be handled in conformance with the HWCL (Subsections 8.13.6.1.4, 8.13.6.2.2, and 8.13.7).
Environmental Health Standards for the Management of hazardous Waste (22 CCR 66001 et seq.)	Controls storage transportation treatment, and disposal of hazardous waste.	Hazardous waste will be handled in conformance with the Title 22 regulations. (Subsections 8.13.6.14, 8.13.6.2.2, and 8.13.7)
Porter-Cologne Water Quality Control Act (California Water Code, Section 13000 et seq.)	Controls discharge of wastewater to surface waters and groundwaters of California.	Industrial and sanitary wastewater will be discharged to the San Francisco combined sewer system (Subsections 8.13.6.1.3 and 8.13.6.2.1).
Asbestos Airborne Toxic Control Measure (California Air Resources Board Regulation) (17 CCR 93106)	Requires implementation of standard dust control measures for projects that disturb less than one acre of soil or rock containing asbestos and preparation of an asbestos dust mitigation plan for projects disturbing an area greater than one-acre.	If applicable, standard dust control measures will be implemented or an asbestos dust mitigation plan will be prepared in accordance with the measure (Subsection 8.13.6.1.2).

TABLE 8.13-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Waste Management

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
Hazardous Waste Source Reduction and Management Review Act of 1989 22CCR §67100.1 et seq	Requires generators of hazardous waste above threshold quantities to prepare a source reduction plan and submit a performance report documenting waste recycling and minimization efforts.	If the SFERP generates hazardous wastes in excess of threshold quantities, the City will file the required documentation (Subsections 8.13.2.2, 8.13.6.2, and 8.13.8)
California Fire Code	Controls storage of hazardous materials and wastes and the use and storage of flammable/combustible liquids as well as the handling of asbestos and asbestos-containing materials during building demolition.	Wastes will be accumulated and stored and asbsestos containing materials will be in accordance with Fire Code requirements. Permits for storage of hazardous waste and asbestos related work will be obtained, as needed, from the San Francisco Fire Department (Subsection 8.13.10).
Local		
Bay Area Air Quality Management District Regulation 11-2	Requires notification to the Bay Area Air Quality Management District 10 days prior to commencement of demolition activities whether or not the project will disturb asbestos containing materials.	If applicable, the Bay Area Air Quality Management District will be notified of demolition activities in accordance with Regulation 11-2 (Subsection 8.13.6.1.1).
Chapter 34, Section 3407 of the San Francisco Building Code	Establishes requirements for property owners and contractors who engage in activities that remove or disturb lead-based paint on the exteriors of buildings and steel structures.	If applicable, the SFERP will comply with Chapter 36 of the San Francisco Building Code during demolition (Subsection 8.13.6.1.1).
San Francisco General Plan, Environmental Protection Element, Objective 19	Promotes source reduction through reduced use of hazardous materials and generation of hazardous wastes.	The SFERP will minimize the use of hazardous materials and recycle as much waste as possible (Subsections 8.13.6 and 8.13.7).
San Francisco General Plan, Environmental Protection Element, Objective 21	Controls illegal disposal and eliminates land disposal of untreated waste by requiring legal disposal of waste and encouraging enforcement actions against generators who dispose of hazardous wastes illegally.	The SFERP will legally dispose of all hazardous waste and will recycle as much of this waste as possible (Subsections 8.13.6.1.2, 8.13.6.1.4, and 8.13.6.2.2).
San Francisco Source Reduction and Recycling Element of the County Integrated Waste Management Plan	Specifies how the City and County would achieve waste diversion goals of 25 percent by 1995 and 50 percent by 2000, including requirements for source reduction and recycling.	The SFERP will comply with the goals of the Source Reduction and Recycling Element (Subsections 8.13.6.1.3, 8.13.6.2.1, and 8.13.7).
City and County of San Francisco Resolution 679-02	Establishes a citywide goal of 75 percent recycling by 2010 and a long-term goal of zero waste.	The SFERP will comply with the City and County of San Francisco recycling goal (Subsections 8.13.6.1.3, 8.13.6.2.1, 8.13.7, and 8.13.8).
City and County of San Francisco Resolution 002-03-COE	Establishes a citywide goal of zero waste production by 2020.	The SFERP will comply with the City and County of San Francisco recycling goal (Subsections 8.13.6.1.3, 8.13.6.2.1, 8.13.7, and 8.13.8).

TABLE 8.13-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Waste Management

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
City and County of San Francisco Hazardous Waste Management Plan	Provides guidance for local management of hazardous waste.	The SFERP will comply with the County's Hazardous Waste Management Plan (Subsections 8.13.6.1.4, 8.13.6.2.2, and 8.13.7).
San Francisco Health Code, Article 6	Provides regulatory requirements for garbage and refuse collection and transfer stations in the City and County of San Francisco.	Refuse collection will comply with the requirements of Article 6 (8.13.6.1.3 and 8.13.6.2.1).
San Francisco Public Health Code, Article 21	Requires preparation of a Hazardous Materials Business Plan (HMBP) for storage of hazardous materials, including hazardous wastes. Also requires owner to close the facility in accordance with an approved closure plan.	An HMBP will be prepared for submittal to the San Francisco Department of Public Health and a closure plan will be prepared and implemented upon closure of the facility (Sections 8.13.6.1.4, 8.13.6.2.2, and 8.13.6.3.2)
San Francisco Health Code, Article 22	Specifies requirements for hazardous waste management in San Francisco.	Hazardous wastes produced during construction and operation will be managed in accordance with Article 22 (Subsections 8.13.6.1.4, 8.13.6.2.2, and 8.13.8).
San Francisco Health Code, Article 22A	Previously referred to as the "Maher Ordinance," requires a site history, soil investigation, and mitigation plan for site contamination for sites bayward of the historic high tide line that require excavation of 50 cubic yards or more of soil.	A site history has been completed. The SFERP will implement a site investigation and prepare a site mitigation plan and maintenance plan if required (Subsections 8.13.6.1.2, 8.13.6.2.3, and 8.13.8).
San Francisco Public Works Code, Article 4.1	Establishes discharge limitations for industrial wastewater discharges to the combined sewer system and requires a permit for discharge.	Groundwater produced during dewatering and nonhazardous wastewater produced during construction and operation of the SFERP will be discharged to the combined sewer system in accordance with the requirements of this article (Subsections 8.13.6.1.3, 8.13.6.2.1, and 8.13.8).
City and County of San Francisco Department of Public Works Order No. 158170	Specifies discharge limitations for discharge to the combined sewer system in addition to those specified in Article 4.1.	Groundwater produced during dewatering and nonhazardous wastewater produced during construction and operation of the SFERP will be discharged to the combined sewer system in accordance with the requirements of this order (Subsections 8.13.6.1.3, 8.13.6.2.1, and 8.13.8).

requirements for solid waste disposal facilities where nonhazardous waste from the SFERP that is not recycled will be disposed. Subtitle C controls the generation, transportation, treatment, storage, and disposal of hazardous waste through a comprehensive "cradle-to-grave" system of hazardous waste management techniques and requirements. It applies to all states and to all hazardous waste generators (above certain levels of waste produced). The SFERP will conform to this law in its generation, storage, transportation,

and disposal of any non-hazardous and hazardous waste generated at the facility. The United States Environmental Protection Agency (USEPA) has delegated its authority for implementing the law to the State of California.

The USEPA regulates wastewater under the Clean Water Act (CWA). The discharge of cooling tower blowdown, industrial wastewater, and sanitary wastewater to the San Francisco combined sewer system would be regulated by this act, which is described in more detail in Subsection 8.14, Water Resources.

8.13.2.2 State

In California, nonhazardous solid waste is regulated by the California Integrated Waste Management Act (CIWMA) of 1989, found in Public Resources Code (PRC) Section 40000, et seq. This law provides an integrated statewide system of solid waste management by coordinating state and local efforts in source reduction, recycling, and land disposal safety. It mandates local jurisdictions to meet diversion, or recycling, goals of 25 percent by 1995 and 50 percent by the year 2000. In accordance with this law, counties are required to submit Integrated Waste Management Plans to the state. This law directly affects the City and County of San Francisco and the solid waste hauler and disposer that will collect SFERP solid waste.

RCRA allows states to develop their own programs to regulate hazardous waste, provided that they are at least as stringent as RCRA. California's hazardous waste program is contained in the California Hazardous Waste Control Law (HWCL) specified in Health and Safety Code Section 25100, et seq. The HWCL is more stringent than RCRA and regulates additional hazardous wastes that are not classified as hazardous under RCRA. Because California has its own hazardous waste control law, hazardous waste management during construction and operation of the SFERP facility will be subject to, and comply with, the HWCL.

The Hazardous Waste Source Reduction and Management Review Act of 1989, specified in Title 22 of the California Code of Regulations, section 67100.1, et seq, requires facilities generating hazardous wastes in excess of 5,000 kilograms or 5 kilograms of extremely hazardous waste to examine their waste generating processes to determine the amounts and types of wastes generated; determine waste minimization procedures to reduce waste generation at the source; develop a Hazardous Waste Source Reduction and Evaluation Plan; and prepare a hazardous waste performance report. The SFERP will prepare the required planning and documentation.

Wastewater is regulated under the Porter-Cologne Water Quality Control Act by the State Water Resources Control Board and Regional Water Quality Control Board. Cooling tower blowdown, industrial wastewater, and sanitary wastewater discharged to the San Francisco combined sewer system would be subject to this act, which is described in more detail in Subsection 8.14, Water Resources.

The California Air Resources Board (CARB) adopted the Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (CARB, 2002) which became effective in the Bay Area Air Quality Management District (BAAQMD) on November 19, 2002. The ATCM requires use of best available dust mitigation measures to prevent offsite migration of asbestos-containing dust from road

construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of ultramafic rock (ultramafic rocks are formed in high temperature environments well below the surface of the earth), serpentine (serpentine is a naturally occurring group of minerals that can be formed when ultramafic rocks are metamorphosed during uplift to the earth's surface. Serpentinite is a rock consisting of one or more serpentine minerals, formed when ultramafic rocks are metamorphosed. This rock type is commonly associated with ultramatic rock along faults such as the Hayward Fault. Small amounts of chrysotile asbestos, a fibrous form of serpentine minerals, are common in serpentinite), or asbestos (asbestos is a term used for several types of naturally occurring fibrous materials found in many parts of California). The BAAQMD implements the regulation. As discussed in Subsection 8.15, Geology, the SFERP site is located in the Hunters Point Shear Zone within the Franciscan Complex. Bedrock within this zone is primarily comprised of serpentinite. Alluvial deposits that overlay the Franciscan bedrock at the site were derived from topographic highs around the site that would also be comprised of serpentinite-containing bedrock. Artificial fill used at the site may have also been derived from this bedrock. If asbestos is present in the fill or bedrock that will be excavated for this project, the Asbestos ATCM would apply.

8.13.2.3 Local

8.13.2.3.1 Nonhazardous Solid Waste Management. The San Francisco Department of Public Health (SFDPH) will be responsible for administering and enforcing Article 6 of the San Francisco Health Code for solid, nonhazardous waste produced during construction and operation of the SFERP. The project will also implement source reduction and recycling efforts to help San Francisco meet its goal of 75 percent landfill diversion by 2010 in accordance with Resolution 679-02; and zero waste production by 2020 in accordance with Resolution 002-03-COE.

8.13.2.3.2 Hazardous Waste and Closure. Hazardous waste management will be subject to the requirements of Article 22 of the San Francisco Health Code, Hazardous Waste Management. This article authorizes the SFDPH to implement the requirements of the HWCL related to hazardous waste generators in San Francisco. In accordance with this article, the SFDPH has the authority to conduct inspections of any facilities where hazardous wastes are stored, handled, processed, disposed of, or treated to recover resources and must maintain records to document compliance with the HWCL.

Hazardous wastes generated at the facility would be described in the Certificate of Registration and Hazardous Materials Plan prepared for the facility in accordance with Article 21 of the San Francisco Health Code. This article is described in more detail in Subsection 8.12, Hazardous Materials. Section 1154 of Article 21 also specifies requirements for closure of the facility. In accordance with Article 21, the SFPUC would prepare and implement the required closure plan.

8.13.2.3.3 Discharge of Wastewater. The discharge of nonhazardous wastewater would be subject to the requirements of Article 4.1 of the San Francisco Public Works Code and the San Francisco Department of Public Works Order No. 158170 that regulate the quantity and quality of industrial discharges to the combined sewer system. In accordance with these, A Class I discharge permit from the Department of Public Works would be required. In addition, under this ordinance, any dewatering effluent produced during construction would require a permit

for discharge to the combined sewer system. The requirements of Article 4.1 and Order 158170 are described in more detail in Subsection 8.14, Water Resources.

8.13.2.3.4 Requirements for Site Investigation. Because the proposed location of the SFERP and much of the wastewater line are located bayward of the historic tideline and would involve the excavation of greater than 50 cubic yards of soil, Article 22A of the San Francisco Health Code, implemented by the SFDPH, would apply to construction of the SFERP. This article protects the health and safety of the workers, residents, and occupants from risks associated with hazardous wastes in the soil by requiring a site assessment and mitigation of any risks identified as a condition for construction of a planned project. The requirements will be triggered by a building permit application or equivalent. The City of San Francisco is not subject to the Building Code.

8.13.2.3.5 Hazardous Building Materials. Demolition of the Station A buildings may or may not be a part of the SFERP project. If it is, it will be subject to the notification requirements of BAAQMD Regulation 11-2. This regulation includes specific notification requirements for demolition projects whether or not asbestos-containing materials will be disturbed during demolition and specifies requirements applying to asbestos abatement activities. If demolition is part of the project, the project will be subject to the requirements of this regulation because it will include demolition.

Chapter 34, Section 3407 of the San Francisco Building Code includes requirements for projects that disturb lead-based paint on the exterior of buildings or steel structures. This code protects the health and safety of the workers, residents, and occupants from risks associated with lead-based paint by including specific requirements to control lead-based paint during demolition activities. If demolition is part of the project and there is lead-based paint on exterior or steel surfaces to be demolished, this code will apply to the project.

8.13.2.4 Codes

The design, engineering, and construction of hazardous waste storage and handling systems will be in accordance with all applicable codes and standards, including:

- The Uniform Fire Code
- The Uniform Building Code
- The Uniform Plumbing Code
- California Building Code
- California Fire Code
- San Francisco Health Code
- San Francisco Municipal Code

8.13.3 Environmental Condition of Site

The existing Potrero Power Plant has historically been used for various industrial operations since the late 1800s. These include a sugar refining company, barrel manufacturing facility, and a manufactured gas plant. Residues generated from the former site operations consist primarily of oil and coal tar wastes and chemicals associated with these wastes have been identified in soil, groundwater, and sediments at the Potrero Power Plant site.

In 2000, a database review conducted for the Southern Waterfront Supplemental Environmental Impact Report (EIR), a supplement to the Port of San Francisco's Waterfront Land Use Plan EIR, identified the Potrero Power Plant in several environmental databases, summarized in Table 8.13-2. The entire facility is undergoing investigation and cleanup under regulatory oversight of the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) as the lead agency. Site assessments and investigations of soil and groundwater quality have been ongoing since 1991. The results of these investigations that are relevant to the project site are discussed below. Rights and responsibilities for investigation and cleanup at the site are also addressed in a private agreement between the former and current owners of the site.

TABLE 8.13.-2
Environmental Databases that the Potrero Power Plant has been Identified In

Database and Acronym	Description
RCRA Corrective Action Sites (CORRACTS)	RCRA permitted facilities that are undergoing corrective action
RCRA Violation Sites (RCRA Viol)	RCRA permitted facilities with violations
CalSites (SCL)	Potential hazardous waste sites identified by the DTSC
Comprehensive Environmental Response, Compensation, and Liability Information System No Further Action Planned (CERCLIS NFRAP) –	Sites previously identified under CERCLIS but designated for no further action.
Leaking Underground Storage Tanks (LUST)	Sites with leaking underground storage tanks
Cortese Hazardous Waste and Substances Site List (CORTESE)	A compilation of sites listed in the LUST and other databases
Emergency Response Notification System (ERNS)	These cases are usually spills or releases of chemicals reported to federal authorities

Source : VISTA Information Solutions, 2000.

The 4.5-acre project site is located within the southwestern part of the Potrero Power Plant. The sugar refining company, barrel manufacturing facility, and manufactured gas plant all historically operated within the project site. A portion of the site was also used as a satellite hazardous waste accumulation area and another portion formerly contained an oil tank used to store dielectric fluids (likely to contain PCBs). Spills may have also occurred within the project area.

On the basis of investigations conducted in 1998 and 2000 (Phase I and II Environmental Site Assessment prepared for the Mirant Unit 7 proceeding) localized areas of soil and groundwater have been affected by chemical releases from past activities. The chemicals of concern in the soil include total petroleum hydrocarbons (TPH) at a maximum concentration of 11,600 milligrams per kilogram (mg/kg); polynuclear aromatic hydrocarbons (PAHs) at a maximum concentration of 4,573 mg/kg; and cyanide at a maximum concentration of 26.7 mg/kg. In addition, soil throughout much of the site contains several metals at concentrations greater than background or industrial preliminary remediation goals (PRGs). The chemicals of concern identified in the groundwater include benzene at a maximum concentration of 0.0149 milligrams per liter (mg/L); total petroleum hydrocarbons at a maximum concentration of 38.9 mg/L; PAHs at a maximum concentration of 0.389 mg/L; and cyanide at maximum concentration of 4.8 mg/L. Dense

non-aqueous phase liquids (DNAPLs) and light non-aqueous phase liquids (LNAPLs) that have been identified in the northeast portion of the Potrero Power Plant site have not been detected within the SFERP project site. Previous investigation of a portion of the project site did not indicate the presence of asbestos in the materials sampled.

The project may include demolition of two existing masonry buildings, Station A and the compressor house, referred to in this section as the Station A buildings. Surveys to identify hazardous building materials such as asbestos-containing materials, lead-based paint, and PCB-containing electrical equipment have been performed and the majority of the hazardous building materials have been abated and properly disposed of off-site. There is water present in the lower level of Station A although the origin of the water (surface runoff or groundwater) is not known.

8.13.4 Project Waste Generation

Waste will be generated at the site during facility construction and operation. Types of waste will include excavated soil, nonhazardous solid waste, groundwater produced during dewatering, nonhazardous wastewater, and liquid and solid hazardous waste.

8.13.4.1 Construction Phase

During construction, the primary wastes generated will be soil excavated for construction and solid nonhazardous waste. However, some nonhazardous liquid waste and both solid and liquid hazardous waste will also be generated. The types of waste and their estimated quantities are described below.

8.13.4.1.1 Soil. Potentially contaminated soil would be excavated for construction of the SFERP facilities. As discussed in Subsection 8.13.3, previous sampling by the former and current site owners has identified total petroleum hydrocarbons, PAHs, cyanide, and several metals in the soil within the SFERP project boundaries. It is likely that some of the soil that would be excavated for construction of the project could contain these chemicals and could require specific storage and handling requirements during construction and possibly disposal as a hazardous waste, depending on the concentrations identified. Requirements for soil sampling, site mitigation, waste classification and disposal, and waste piles are discussed in Subsection 8.13.6.1.1.

Asbestos Containing Soil. Excavation for construction of the SFERP could encounter bedrock or fill materials containing naturally occurring asbestos. Should naturally occurring asbestos-containing materials be excavated, the requirements of the Asbestos Airborne Toxics Control Measure would apply. The requirements of this measure are discussed in Subsection 8.13.6.1.2.

8.13.4.1.2 Nonhazardous Solid Waste. Potential nonhazardous solid waste streams and their estimated volumes are described below. Recycling goals and disposal requirements for nonhazardous solid wastes produced during construction are discussed in Subsection 8.13.6.1.3.

Paper, Wood, Glass, and Plastics. Paper, wood, glass, and plastics will be generated from packing materials, waste lumber, insulation, and empty nonhazardous chemical containers. Approximately 10 tons of these wastes will be generated during project construction.

Concrete and Masonry. If demolition is part of the project, approximately 54,700 tons of excess concrete and masonry will be generated during construction due to demolition of the existing Station A buildings.

Metals. Waste metals will include steel from demolition debris, if demolition is part of the project, welding/cutting operations during construction, packing materials and empty nonhazardous chemical containers. Aluminum waste will be generated from packing materials and electrical wiring. Approximately 4,500 tons of waste metal could be generated during construction.

8.13.4.1.3 Wastewater. Wastewater generated during construction will include sanitary waste, stormwater runoff, equipment washdown water, waste water from pressure testing the gas supply line after it is constructed, water from excavation dewatering during construction (if dewatering is required), and water removed from the lower level of Station A. Depending on the chemical quality of these wastewaters, they could be classified as hazardous or nonhazardous. As discussed in Subsection 8.13.6.1.3, the waste waters would be sampled and if they are hazardous would be disposed of as described in Subsection 8.13.6.1.4. Methods for disposing of nonhazardous wastewaters are identified in Subsection 8.13.6.1.3.

8.13.4.1.4 Hazardous Waste. Most of the hazardous waste generated during construction will consist of liquid waste, such as flushing and cleaning fluids, passivating fluid (to prepare pipes for use), and solvents. Some hazardous solid waste such as welding materials, dried paint from construction activities, and possibly asbestos-containing materials and lead-based paint from hazardous building materials abatements (if conducted for this project) may also be generated. Flushing and cleaning waste liquid will be generated as pipes are cleaned and flushed. The volume of flushing and cleaning liquid waste generated is estimated to be one to two times the internal volume of the pipes cleaned. The quantity of welding, solvent, and paint waste is expected to be minimal. The quantity of asbestos-containing materials and lead-based paint produced if hazardous building material abatements are conducted as part of this project would be determined on the basis of hazardous building materials surveys conducted before demolition. Wastewaters generated during construction could also be considered hazardous, if demonstrated so by sampling described in Subsection 8.13.6.1.2. Methods for recycling and disposal of hazardous wastes during construction are identified in Subsection 8.13.6.1.4.

8.13.4.2 Operation Phase

During facility operation, the primary waste generated will be nonhazardous wastewater. However, nonhazardous solid waste and varying quantities of both solid and liquid hazardous waste will also be generated periodically. The types of waste and their estimated quantities are discussed below.

8.13.4.2.1 Nonhazardous Solid Waste. The facility will produce maintenance and wastes typical of power generation operations. These will include rags, turbine air filters, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers and small office operations, and other miscellaneous solid wastes. The quantity generated is estimated to be about 20 cubic yards per year. Recycling goals and disposal requirements for nonhazardous solid wastes are discussed in Subsection 8.13.6.2.1.

8.13.4.2.2 Nonhazardous Wastewater. As discussed in Subsection 8.14, Water Resources, process wastewater that will be produced during operation of the SFERP facility includes cooling tower blowdown, filter backwash, reverse osmosis concentrate, and plant drainage. Each of these process waste streams and the expected flow rate is shown on the water balance diagram presented earlier in Figures 2-3 and 2-4 and is described below. The descriptions address the ultimate discharge method for all wastewater streams produced. In addition to these process wastewater streams, the SFERP facility will generate sanitary sewage consisting of wastewater collected from sinks, toilets, and other sanitary facilities. The following sections describe these waste streams; disposal methods for the nonhazardous wastewater are discussed in Subsection 8.13.6.2.1.

Cooling Tower Blowdown. Cooling tower blowdown will consist of water circulated in the evaporative cooler system and residues of the water treatment chemicals added to the circulating water to control scaling and bio-fouling of the cooling tower and corrosion of the circulating water piping and condenser tubes. The blowdown will be discharged to the waste water collection system as required to maintain the level of dissolved solids of the cooling water within acceptable ranges; the number of cycles that the water is used for will be dictated by the water supply quality.

Power Cycle Makeup Treatment Wastes. Wastewater from the power cycle makeup water treatment system will consist of the reject stream from the reverse osmosis (RO) units, and backwash water from the ultra-filters (UF) upstream of the RO units. The UF and RO units are used to reduce the concentration of dissolved solids in the plant makeup water prior to use in the Combustion Turbine Generator (CTG) system where the process water supply is treated in the electro deionization equipment. The UFs are used as pretreatment prior to the RO units to prevent RO membrane fouling.

The wastewater stream from the power cycle makeup water treatment system will contain: 1) concentrated constituents of the recycled water; 2) residues of the chemicals added to the raw water to coagulate suspended solids prior to filtration; 3) chemicals added to the UF filtrate to eliminate free chlorine, which would damage the RO membranes; and 4) chemicals added to adjust pH for the control of membrane scaling. This water will be discharged to the waste water collection system.

Plant Drainage. Plant drainage will consist of area washdown, equipment leakage, and drainage from facility equipment areas. Water from these areas will be collected in a system of floor drains, sumps, and piping, and routed to the wastewater collection system. Drains that could contain oil or grease will be routed to the wastewater collection system through an oil/water separator.

There will be no discharge from the chemical tank containment areas to the waste collection system. As discussed in Subsection 8.12, Hazardous Materials, the chemical tank storage areas will be designed with containment facilities to contain potential spills. In the unlikely event of a chemical spill, the spill will be cleaned up on-site by plant personnel or by a separate contractor brought in to assist the plant with spill cleanup.

8.13.4.2.3 Hazardous Waste. Hazardous waste generated will include waste lubricating oil and spent lubrication oil filters from the combustion turbines and selective catalytic reduction (SCR) catalyst units. The catalyst units contain heavy metals that are considered

hazardous. A list of anticipated hazardous wastes generated at the plant is presented in Table 8.13-3. Recycling and disposal requirements for hazardous wastes are discussed in Subsection 8.13.6.2.2.

TABLE 8.13-3
Hazardous Wastes Generated at the Facility During Operations

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Lubricating oil	Gas turbine lubricating oil system	Hydrocarbons	Small amounts from leaks and spills	Hazardous	Cleaned up using sorbent and rags – disposed of by certified oil recycler
Lubricating oil filters	Gas turbine lubricating oil system	Paper, metal, and hydro-carbons	Approximately 12 per year	Hazardous	Recycled by certified oil recycler
Laboratory analysis waste	Water treatment	Miscellaneous analysis reagent chemicals	Approximately 50 gallons per year	Hazardous	Recycled by certified recycler
Spent SCR catalyst units	SCR system	Metal and heavy metals, including vanadium	Catalyst changed out every few years	Hazardous	Recycled by SCR manufacturer or disposed of in Class I landfill
Oily rags	Maintenance, wipe down of equipment, etc.	Hydrocarbons, cloth	Approximately 800 rags per year	Hazardous	Recycled by certified oil recycler
Oil sorbents	Cleanup of small spills	Hydrocarbons	Approximately 200 pounds per year	Hazardous	Recycled or disposed of by certified oil recycler
Cooling tower sludge	Deposited in cooling tower basin by cooling water	Dirt from air, arsenic from water	200 lb/yr	Potentially hazardous, but usually not	Class II landfill if nonhazardous; Class I if hazardous
Chemical feed area drainage	Spillage, tank overflow, area washdown water	Water with water treatment chemicals	Minimal	May be hazardous if corrosive	On-site neutralization, if required, then discharged to cooling tower basin

8.13.5 Waste Disposal Sites

Nonhazardous solid waste (often referred to as solid waste, municipal solid waste [MSW], or garbage) will be recycled or deposited in a Class III landfill, as described in Subsection 8.13.6. Hazardous wastes, both solid and liquid, will be delivered to a permitted offsite treatment, storage, and disposal (TSD) facility for treatment or recycling, or will be deposited in a permitted Class I landfill. The following subsections describe the waste disposal sites available for disposal of SFERP wastes.

8.13.5.1 Nonhazardous Solid Waste

Approximately 54,700 tons of nonhazardous demolition debris as well as other solid waste will be generated during construction of the SFERP and solid waste will continue to be generated during operation of the project. If demolition is part of the project, demolition debris will generally be recycled at a local or regional permitted recycling facility. Other

solid wastes will be recycled to the extent possible, and what can not be recycled will be disposed of at a permitted landfill as discussed below. Although the actual waste classification of the soil that will be excavated for construction of the project can not be made at this time, approximately 7,250 cubic yards of soil could require off-site disposal, much of which may be nonhazardous. Waste classification is described in Subsection 8.13.6.1.2. As described in this section, classification of the soil for disposal purposes would be made on the basis of sampling completed once the soil is excavated. Soil that is determined to be nonhazardous on the basis of the sampling conducted could be suitable for reuse at a construction site or disposal at a regional disposal facility, depending on the chemical quality.

The City and County of San Francisco has an exclusive agreement with Waste Management, Inc. (WMI) for disposal of up to 15 million tons of municipal solid waste from San Francisco at Altamont Landfill, owned and operated by WMI. As of December, 2003, approximately 10 million tons of that capacity had been used by the City leaving a balance of 5 million tons (Drew, 2003) (The agreement with WMI does not include construction and demolition debris. Thus, nonhazardous construction and demolition debris can be disposed of in any of the landfills described in Table 8.13-4.). San Francisco has reached the statewide goal of 50 percent recycling and currently approximately 700,000 to 800,000 tons of waste per year at Altamont Landfill through this contract. Efforts are underway to increase recycling rates in accordance with City Resolutions 679-02 and 002-03-COE.

According to the CIWMB, Altamont Landfill has a total capacity of 58.9 million cubic yards of refuse and the remaining capacity as of 2001 was 15.8 million cubic yards. The CWIMB indicates that the active Solid Waste Facility Permit expires in 2005. However, Altamont has obtained a Conditional Use Permit (CUP) for expanded facilities and is in the process of revising their Solid Waste Facility Permit to include an expanded area that would increase the permitted disposal capacity to 87.1 million tons (St. John, 2003). According to the CIWMB, there are no open enforcement actions against Altamont Landfill and no violations have been issued to this facility for the past 2 years (CIWMB, 2003b).

The exclusive agreement between the City and County of San Francisco and Waste Management, Inc. will expire once the total capacity of the agreement is reached. At the current disposal rate, the exclusive contract will expire by approximately 2010, although successful recycling efforts will extend the duration of this contract. Table 8.13-4 lists several California disposal facilities with the remaining capacities capable of accommodating waste from San Francisco.

TABLE 8.13-4
Solid Waste Disposal Facilities

Landfill/MRF/ Transfer Station	Location	Class	Permitted Capacity,[a] (Cubic Yards)	Permitted Throughput[a] (Tons per Day)	Remaining Capacity[a] (Cubic Yards)	Estimated Closure Date[a]	Violation of Minimum State Standards Noted[b]
Altamont Landfill	Livermore, CA	III	58,900,000[c]	11,150	15,843,000	1/1/2005[c]	No
Kirby Canyon	San Jose, CA	III	36,400,000	2,600	57,271,507	12/31/2022	No

TABLE 8.13-4
Solid Waste Disposal Facilities

Landfill/MRF/ Transfer Station	Location	Class	Permitted Capacity,[a] (Cubic Yards)	Permitted Throughput[a] (Tons per Day)	Remaining Capacity[a] (Cubic Yards)	Estimated Closure Date[a]	Violation of Minimum State Standards Noted[b]
Ox Mountain Sanitary Landfill	Half Moon Bay, CA	III	37,900,000	3,598	44,646,148	1/1/2018	No
Norcal Waste Systems Ostrom Road Landfill, Inc.	Wheaton, CA	II/III	41,822,300	3,000	11,252,490	12/31/2066	No

[a] Based on CIWMB Solid Waste Inventory System Database (CIWMB, 2003b).
[b] Based on the CIWMB *Inventory of Solid Waste Facilities Violating State Minimum Standards* (CIWMB, 2003a).
[c] The official permitted capacity is 58,900,000 cubic yards and the estimated closure date on record with the state is January 1, 2005 (CIWMB, 2003b); however, Altamont Landfill currently has a Conditional Use Permit for an expanded capacity and is in the process of revising its Solid Waste Facility Permit to include this information (St. John, 2003).

As discussed above, estimates of nonhazardous solid waste production, excluding demolition debris which would be recycled, are approximately 14.5 tons during construction and 20 tons per year during operation plus up to 7,250 cubic yards of soil that would be excavated during construction. Because the SFERP will incorporate a proactive recycling program to achieve the City and County recycling goals, and adequate landfill capacity exists for those wastes that cannot be recycled, disposal of solid nonhazardous waste will not be a constraint on SFERP development.

8.13.5.3 Hazardous Waste

Hazardous waste generated at the SFERP facility will be stored at the facility for less than 90 days. The waste will then be transported to a TSD facility by a permitted hazardous waste transporter. These facilities vary considerably in what they can do with the hazardous waste they receive. Some can only store waste, some can treat the waste to recover usable products, and others can dispose of the waste by incineration, deep-well injection, or landfilling. (Incineration and deep-well injection are not permitted in California.)

According to the California Department of Toxic Substances Control (DTSC), there are 37 facilities in California that can accept hazardous waste for treatment or disposal (DTSC, 2003a). For ultimate disposal, California has the three hazardous waste (Class I) landfills described below. The closest commercial hazardous waste disposal facility is the Kettleman Hills facility in Kettleman City.

8.13.5.3.1 Clean Harbors' (Formerly Safety-Kleen's) Buttonwillow Landfill in Kern County. This facility includes two active landfills. WMU-34 has a total capacity of 345,000 cubic yards and a remaining capacity of about 50,000 cubic yards; closure of this unit is expected in 2006. WMU-35 has a total capacity of 10,700,000 cubic yards and a remaining capacity of about 10,500,000 cubic yards; this unit is scheduled for closure in 2021 (Gius, 2004). This landfill is permitted to accept California and RCRA hazardous wastes.

8.13.5.3.2 Clean Harbors' (Formerly Safety-Kleen's) Westmorland Landfill in Imperial County. This facility includes one active landfill (LC-2) and two proposed landfills (LC-4, LC-5) which are permitted. LC-2 has a total capacity of 750,000 cubic yards and a remaining capacity of approximately 20,000 cubic yards; this unit is scheduled for closure in 2006. LC-4 is a permitted landfill that has not yet been constructed. It will have a total capacity of 870,000 cubic yards and is scheduled for closure in 2020. LC-5 is a permitted landfill that is scheduled for construction in 2004/2005. It will have a total capacity of 1,860,000 cubic yards. LC-5 is scheduled for closure in 2013 (Gius, 2004). This disposal facility is permitted to accept California and RCRA hazardous wastes.

8.13.5.3.3 Waste Management's Kettleman Hills Landfill in Kings County. This facility accepts Class I, II, and III waste. The Class I landfill is permitted for and will accept all hazardous wastes except radioactive, compressed gases, medical, and unexploded ordinance (UXO); this landfill has permitted capacity of 10.7 million cubic yards with a remaining capacity of 7.3 million cubic yards as of June 2003 (DTSC, 2003b). The permitted closure date for the Class I landfill is June 30, 2013. The Class II and III waste disposal facility has a planned closure date of 2010. It is permitted to accept up to 1,400 tons per day of solid waste and contaminated soil and the total permitted capacity is 4.2 million cubic yards (CIWMB, 2003b). As of September 2001, the remaining capacity was 3.8 million cubic yards.

8.13.5.3.4 Additional Commercial Hazardous Waste Treatment and Recycling Facilities. In addition to hazardous waste landfills, there are numerous offsite commercial liquid hazardous waste treatment and recycling facilities in California. Some of the closest facilities include ECS Refining in Santa Clara, Romic Environmental Technologies Corporation in East Palo Alto, Clean Harbors in San Jose, Micro Metallics Corporation in San Jose, Metech International, Inc. in Gilroy, Evergreen Oil, Inc. in Newark, Wit Refining in San Jose, Technichem in Emeryville, AERC.com, Inc. in Hayward, and Ionization Research Company, Inc. in Milpitas (DTSC, 2003a).

Because the project would emphasize recycling of hazardous wastes and adequate disposal and treatment facility capacities exist, disposal of solid and liquid hazardous wastes during construction and operation, including any soil that is classified as a hazardous waste, determined as in Subsection 8.13.6.1.2, will not be a constraint on SFERP development.

8.13.6 Waste Management Methods and Mitigation

The handling and management of waste generated by the SFERP will follow the hierarchical approach of source reduction, recycling, treatment, and disposal. The first priority will be to reduce the quantity of waste generated through pollution prevention methods (e.g., high-efficiency cleaning methods). The next level of waste management will involve reusing or recycling wastes (e.g., used oil recycling). For wastes that cannot be recycled, treatment will be used, if possible, to make the waste nonhazardous (e.g., neutralization). Finally, offsite disposal will be used to dispose of residual wastes that cannot be reused, recycled, or treated.

To ensure compliance with this strategy as well as legal handling and disposal of all wastes, the City will prepare separate waste management plans for the construction and operation phases of the project. The plans will include a description of all waste streams including projections of frequency, amounts generated, and hazard classifications. In addition, the

methods for managing each waste will be identified including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans. The following subsections present requirements for waste handling and disposal that will be included in the waste management plans and a description of how the project will comply with Article 22A of the San Francisco Health Code.

8.13.6.1 Construction Phase

Wastes produced during construction will include soil excavated for construction of the project facilities, nonhazardous solid wastes, nonhazardous wastewater, and hazardous solid and liquid wastes. In addition, if demolition is part of the project, additional hazardous building material surveys and abatement could be required prior to demolition of the Station A buildings.

8.13.6.1.1 Hazardous Building Materials Surveys and Abatement

Asbestos. Section 19827.5 of the California Health and Safety Code, adopted January 1, 1991, requires that local agencies not issue demolition permits until an applicant has demonstrated compliance with notification requirements under applicable Federal regulations regarding hazardous air pollutants, including asbestos. The BAAQMD is vested by the California legislature with authority to regulate airborne pollutants, including asbestos, through both inspection and law enforcement, and in accordance with Regulation 11-2, is to be notified ten days in advance of any proposed demolition or abatement work. Although the City would not be required to obtain a building permit for construction of the SFERP, they would comply with these requirements if applicable. The notification requirements include:

- The names and addresses of operations and persons responsible
- Description and location of the structure to be demolished/altered including size, age and prior use, and the approximate amount of friable asbestos
- Scheduled starting and completion dates of demolition or abatement
- Nature of planned work and methods to be employed
- Procedures to be employed to meet BAAQMD requirements
- The name and location of the waste disposal site to be used

In addition, the City would notify the local office of the State Occupational Safety and Health Administration (Cal/OSHA) of any asbestos abatement to be carried out. Asbestos abatement contractors will be certified by the Contractors Licensing Board and will follow state regulations where there is asbestos-related work involving 100 square feet or more of asbestos containing material.

Lead-Based Paint. Lead-based paint was commonly used prior to 1960, and this type of paint is present in many older buildings. During demolition, where required, the City will comply with Chapter 34, Section 3407of the San Francisco Building Code which establishes requirements for property owners and contractors who engage in activities that remove or

disturb lead-based paint on the exteriors of buildings and steel structures. The ordinance contains performance standards, including establishment of containment barriers that are at least as effective at protecting human health and the environment as those in the most recent Guidelines for Evaluation and Control of Lead-Based Paint Hazards promulgated by the U.S. Department of Housing and Urban Development.

Specific elements of this code, implemented and enforced by the San Francisco Department of Building Inspection (DBI) include a requirement for a containment barrier around any work involving lead paint. For activities involving abrasive blasting, hydroblasting, scraping, or sanding of lead- painted exterior surfaces a HEPA vacuum may be required. Burning, torching, or similar activities are prohibited. Following completion of work involving lead paint, all visible lead paint contaminants must be removed from the work site.

In addition, the ordinance requires the following notification requirements when the total area of lead paint to be disturbed or removed exceeds 10 square feet:

- Notification of the DBI prior to starting work by the owner or contractor describing the nature and location of the work;
- A posted sign at all work sites where containment is required stating that lead work is in progress and that public access is prohibited;
- A posted sign at sites where lead paint is being disturbed and lead dust or soil testing indicates the presence of contaminated soil or dust. The sign would indicate the presence of the contamination identified.

8.13.6.1.2 Soil

Article 22A Compliance and Soil Management and Disposal. As described in Subsection 8.13.3, the SFERP facility will be constructed within an area known to contain contaminated soil. Because the project, including the SFERP location and portions of the wastewater line, is located bayward of the historic high tide line and would involve the excavation of greater than 50 cubic yards of soil, Article 22A of the San Francisco Health Code would apply. The requirements would be triggered by the building permit application or equivalent process (the City and County of San Francisco is not subject to the Building Code). Major requirements include:

- Preparation of a site history report to describe past site uses and identify whether the site is listed as a hazardous waste site pursuant to state or federal regulations;
- Implementation of a soil investigation to evaluate the potential presence of hazardous wastes in the soil;
- Preparation of a soil analysis report that evaluates the results of chemical analysis of the soil samples;
- Preparation of a site mitigation report, if contamination is identified, assessing potential environmental and health and safety risks, recommending measures to mitigate the risks, identifying appropriate waste disposal and handling requirements, and presenting criteria for on-site reuse of soil;

- Preparation of a certification report stating that either 1) no hazardous wastes present in the soil present an unacceptable risk and that no mitigation measures are required; or 2) all mitigation measures recommended in the site mitigation report have been completed and that completion of the mitigation measures has been verified through follow-up soil sampling and analysis, if required.

Previous reports prepared on behalf of PG&E should meet the requirements of the required site history although a separate site history report will need to be prepared for those portions of the wastewater line located bayward of the historic high tide line. A project-specific soil analysis report(s) will be required to identify the concentration of chemicals present in the soil at the SFERP location and along the wastewater pipeline alignment that would be excavated for construction. The report(s) will be prepared by knowledgeable, certified professionals and provide information on historic and current hazardous waste contamination at the property. The soil analysis report will be submitted to the SFDPH, and the SFBRWQCB. Based on the soil analysis report, the City will prepare a site mitigation plan that: 1) assesses potential environmental and health and safety risks; 2) recommends mitigation measures, if any are necessary, that would be protective of workers and visitors to the SFERP facility; 3) recommends measures to mitigate the risks identified; 4) identifies appropriate waste disposal and handling requirements; and 5) presents criteria for on-site reuse of soil. The recommended measures will be completed during construction and upon completion, the City will prepare a certification report stating that all mitigation measures recommended in the site mitigation report have been completed and that completion of the mitigation measures has been verified through follow-up soil sampling and analysis, if required. If the soil sampling report does not indicate a potential risk to future site visitors and workers, then no mitigation will be required and the certification report will state that hazardous materials present in the soil do not present an unacceptable risk and that no mitigation measures are required. A deed restriction may be required if hazardous waste levels remain on site in the subsurface.

The construction contract for the project will also include a provision that if previously unidentified areas of contamination are identified during construction, as indicated by discolored soil, odor, or some other condition, the contractor shall have a soil sample taken and submitted for laboratory analysis and stop work in that particular area until the results of the soil sample are known and proper material handling instructions can be determined.
Waste Classification and Disposal.

In accordance with California Code of Regulations, Title 22, Sections 66260 through 66261.10, the excavated soil will be classified as a hazardous waste if it exhibits the characteristics of ignitability, corrosivity, reactivity, or toxicity. A waste is considered toxic in accordance with 22CCR S66261.24 if it contains certain metals or organic substances at soluble concentrations greater than federal toxicity regulatory levels using a test method called the toxicity characteristic leaching procedure (TCLP); if it contains total concentrations of certain substances at concentrations greater than the total threshold limit concentration (TTLC) or soluble concentrations greater than the soluble threshold limit concentration (STLC); if it contains specified carcinogenic substances at a single or combined concentration of 0.001 percent; or if toxicity testing indicates toxicity greater than specified criteria. The TCLP, TTLC, and STLC criteria are summarized in Table 8.13-5 with the maximum concentration of each chemical previously identified in the site soil.

TABLE 8.13.5
Soil Disposal Criteria and Maximum Detected On-site Concentration

Metal	Maximum Concentration, mg/kg	Waste Disposal Criteria		
		Regulatory Level[a] (mg/L)	TTLC[b] (mg/kg)	STLC[c] (mg/L)
Arsenic	52.8	5	500	5
Beryllium	5.8	-	-	-
Trivalent Chromium	1,656.7	5	2,500	5
Hexavalent Chromium	Not determined[d]	-	500	5
Lead	1,101.5	5	1,000	5

[a] The regulatory level refers to the soluble concentration of a waste constituent determined using the toxicity characteristic leaching procedure (TCLP). A waste would be considered hazardous by federal regulations if the soluble concentration of a chemical in the TCLP extract exceeded the federal regulatory level specified. Because the TCLP involves a 20-to-1 dilution of the sample, the total concentration of a substance in the soil would need to exceed 20 times the regulatory level for the soluble concentration to possibly be greater than the regulatory level in the extract.

[b] TTLC = total threshold limit concentration. A waste would be considered hazardous by state regulations if the total concentration of a chemical exceeded the TTLC.

[c] STLC = soluble threshold limit concentration. A waste would be considered hazardous by state regulations if the soluble concentration of a chemical exceeded the STLC determined by a waste extraction test which involves a 10-to-1 dilution of the sample. Because of this, the total concentration of a substance would need to exceed 10 times the regulatory level for the soluble concentration to possibly exceed the STLC.

[d] Laboratories typically analyze for total chromium without distinguishing between the trivalent and hexavalent forms unless there is a need to make this distinction. For this project, it would be necessary to determine the concentrations of hexavalent chromium to determine if the waste disposal criteria for this form of chromium would be exceeded.

The maximum soil concentrations identified in Table 8.13-5 are based on the maximum concentration identified in a single sample obtained as part of previous investigations and it is possible that these concentrations are representative of the soil from small portions of the project site; larger quantities of soil excavated for construction of the proposed buildings would likely exhibit different chemical concentrations. The required disposal method for the soil would be dependent on sampling of the soil once it is excavated to determine its hazardous characteristics. Soil classified as hazardous would require disposal at a Class I disposal facility. Class I land disposal facilities can accept hazardous wastes with chemical levels below the federal land disposal restriction (land ban) treatment standards. Class II and III facilities can accept non-hazardous wastes that meet acceptance criteria determined by the state for organic and inorganic compounds. Each landfill has individual acceptance criteria and the appropriate disposal site for a waste will be determined on the basis of the classification of the waste and individual landfill acceptance criteria. Class II and III landfills in the Bay Area have acceptance criteria for lead that are lower than the TCLP or STLC.

Title 40 of the Code of Federal Regulations, Section 268.40, and Title 22 of the California Code of Regulations, Chapter 18, Article 3 identify specific hazardous wastes that are restricted for land disposal. A prohibited waste identified in these regulations may be land disposed only if it meets specified treatment standards. If the soil excavated during construction of the SFERP facility exhibited the characteristic of toxicity for lead based on the TCLP, the soil would need to be treated to reduce soluble lead concentrations. The universal treatment standard (UTS) for wastes containing lead is 0.75 mg/L as measured by

TCLP. However, Title 40 of the Code of Federal Regulations, Section 268.49 specifies alternative LDR treatment standards for contaminated soil. The alternative treatment standards specify that, prior to placement in a land disposal unit, all constituents subject to treatment must achieve a 90 percent reduction in constituent concentrations or a reduction in constituent concentrations to less than 10 times the UTS. In the case of soils exhibiting the toxicity characteristic for lead, the alternate soil treatment standard would be 7.5 mg/L. Other UTS could apply, depending on the concentration of specific chemicals in the soil and the soil could also contain Underlying Hazardous Constituents (UHCs) defined in Title 40 of the Code of Federal Regulations, Section 268.48, which could require treatment to UTSs. Treatment must be conducted by a DTSC permitted contractor or utilizing a DTSC permitted treatment unit.

The California Health and Safety Code, Section 25157.8 also specifies that waste disposed in California that contains lead in excess of 350 ppm can only be disposed in a Class I hazardous waste disposal facility, unless the RWQCB issues a variance to the waste disposal facility for the acceptance of the waste, modifies the waste disposal facility's permit to accept the waste, amends the waste disposal facility's waste discharge requirements to specifically allow disposal of the waste, or approves disposal of the waste at the site of generation.

Soil with total petroleum hydrocarbon concentrations above the detection limit must be disposed of at an appropriate landfill facility or treated to reduce the levels of petroleum hydrocarbons in the soil. In general, soil with total petroleum hydrocarbon levels up to 100 milligrams per kilogram (mg/kg) can be disposed of at a Class III disposal facility. If the concentration is between 100 and 1,000 mg/kg, it can be disposed of at a Class II disposal facility; and if the concentration is greater than 1,000 mg/kg, Class I disposal would be required.

Soil containing greater than 1 percent friable asbestos would be considered hazardous and require disposal as a hazardous waste. "Friable" is defined as easily crumbled or reduced to powder by hand pressure. However, in many cases, naturally occurring asbestos is tightly bound into the rock and is not friable. In this case, or if the asbestos content were less than 1 percent, the soil would not be considered a hazardous waste based on asbestos concentrations.

The contractor would use existing soil data to identify potential "hot spots" containing higher chemical concentrations, and would segregate this soil from soil expected to contain lower chemical concentrations to minimize the quantities of soil requiring disposal as a hazardous waste.

Storage Requirements. Title 40 of the Code of Federal Regulations, Sections 264.551 and 264.554, specifies requirements for construction and monitoring of temporary storage of remediation waste exhibiting RCRA characteristics. Waste staging piles may be used to store remediation waste for up to 2 years, as long as measures are implemented to protect human health and the environment. These measures include the following:

- The waste pile must have a liner that is designed, constructed, and installed to prevent any migration of wastes out of the pile into the adjacent subsurface, soil, groundwater or surface water.

- A water collection and removal system located immediately above the liner that is designed, constructed, maintained, and operated to collect and remove water from the pile.
- During construction or installation, liners and cover systems (e.g., membranes, sheets, or coatings) must be inspected for uniformity, damage, and imperfections.
- While a waste pile is in operation, it must be inspected weekly and after storms to detect evidence of any damage or improper run-off.

The California Health and Safety Code, Section 25123.3, defines remediation waste storage as the temporary accumulation of non-RCRA contaminated soil that is generated and held on-site, and that is accumulated for the purpose of on-site treatment pursuant to a certified, authorized or permitted treatment method. If soil excavated for construction of the SFERP facility is classified as a state or federal hazardous waste, temporary storage of the excavated soil would have to comply with the appropriate state and federal regulations.

Asbestos-Containing Soil. The CARB Asbestos ATCM would apply to excavation within rock or soil containing naturally occurring asbestos. If the project disturbs one acre or less of asbestos-containing materials, the City will implement standard dust mitigation measures specified in the ATCM before construction begins, and maintain each measure throughout the duration of the construction project. If the project disturbs more than one acre of asbestos-containing materials, the City will prepare an asbestos dust mitigation plan specifying measures that would be taken to ensure that no visible dust crosses the property boundary. The asbestos dust mitigation plan will be submitted to and approved by the BAAQMD prior to the beginning of construction, and the City will ensure the implementation of all measures throughout the construction project. In addition, the BAAQMD may require air monitoring to monitor for offsite migration of asbestos dust during construction activities and may change the plan on the basis of the air monitoring results.

8.13.6.1.3 Nonhazardous Solid and Liquid Wastes

Solid Wastes. The City will contract with a hauler and require that disposal of the waste be undertaken in accordance with applicable laws (a 1932 ordinance that regulates refuse collection in San Francisco does not apply to the City and County of San Francisco). During construction, a private waste hauler retained by the general contractor would pick up non-hazardous debris. The City would require the hauler to meet the City recycling goals in the construction contracts prepared for the project. Nonrecyclable materials would be disposed of at a regional solid waste disposal facility.

Wastewater. Sanitary waste will be collected in portable, self-contained toilets. Stormwater runoff will be managed in accordance with an Erosion and Sediment Control Plan prepared for the project and approved by the San Francisco Bureau of Environmental Regulation and Management prior to the start of construction as discussed in Subsection 8.14, Water Resources.

Other waste waters produced during construction could be considered hazardous depending on the concentration of specific chemicals identified. The wastewaters would be sampled and, if characterized as hazardous, would be disposed of as a hazardous waste as described in Subsection 8.13.6.1.3. If the waste water is not hazardous, it would be

discharged to the combined sewer system in accordance with permit requirements issued by the City discussed in Subsection 8.14, Water Resources; the water would be treated prior to discharge to the sewer, if substances are present at concentrations greater than the City's permit requirements.

8.13.6.1.4 Hazardous Liquid and Solid Wastes. All wastes generated by the construction contractor will be handled in compliance with all applicable federal, state, and local laws and regulations, including licensing, training of personnel, accumulation limits and times, and reporting and record keeping. The hazardous waste will be collected in satellite accumulation containers near the points of generation. This waste will be moved daily to the contractor's 90-day hazardous waste storage area, located at the plant construction laydown area. The waste will be transported to a permitted hazardous waste management facility by licensed waste haulers, before expiration of the 90-day storage limit. Waste handling facilities and activities will be subject to inspection by the SFDPH in accordance with Article 22 of the San Francisco Health Code to ensure that handling of hazardous wastes is in accordance with applicable laws and regulations. Hazardous wastes generated during construction will also be disclosed in the Certificate of Registration and Hazardous Materials Business Plan prepared in accordance with Article 21 of the San Francisco Health Code which are further described in Subsection 8.12, Hazardous Materials.

8.13.6.2 Operation Phase

Handling requirements and mitigation measures for the handling of wastes during operation are described in the following subsections. In addition, requirements for the management of any hazardous wastes in the soil following construction are identified.

8.13.6.2.1 Nonhazardous Solid and Liquid Wastes.

Solid Wastes. For disposal of nonhazardous solid wastes during operation, the City will identify waste collection methods to work towards the City and County goals of 75 percent recycling by 2010 and 100 percent recycling by 2020 (Malatesta, 2003). This will include incorporating recycling facilities directly into the project design and development of the best management approach to achieve the recycling goals of the City.

Nonhazardous Wastewater. Process wastewater collected in the wastewater collection system and sanitary sewage from the SFERP facility will be discharged to the SEWPCP in accordance with Article 4.1 of the San Francisco Public Works Code. The wastewater will be discharged via a connection to the San Francisco combined sewer system on 23rd Street under a permit from the City, as described in Subsection 8.14, Water Resources.

8.13.6.2.2 Hazardous Wastes. In accordance with the Hazardous Waste Source Reduction and Management Review Act, the City will develop a Hazardous Waste Source Reduction and Evaluation Plan identifying methods to reduce hazardous waste generation if threshold quantities of hazardous waste are generated. Hazardous waste generation and storage will comply with the requirements of Article 22 of the San Francisco Health Code and applicable federal and state laws. Compliance with these laws will avoid potential effects on human health and the environment from handling and disposing of hazardous wastes. The following general procedures will be employed in accordance with applicable laws:

- The SFERP will be classified as a hazardous waste generator and the City will obtain a site specific Cal-EPA ID number that will be used to manifest hazardous waste from the

SFERP facility. Hazardous waste from the SFERP facility will be stored on-site for less than 90 days before off-site disposal or recycling.

- Hazardous wastes will be accumulated at the generating facility according to CCR Title 22 requirements for satellite accumulation.
- The hazardous waste storage area will be constructed in accordance with applicable hazardous materials regulations discussed in Subsection 8.12, Hazardous Materials. Provisions for storage include appropriately segregated storage areas surrounded by berms to contain leaks and spills. The bermed areas will be sized to hold the full contents of the largest single container and, if not roofed, sized to allow for the rainfall from a 24-hour, 25-year storm. These areas will be inspected daily.
- Hazardous wastes will be collected by a licensed hazardous waste hauler, using a hazardous waste manifest. Wastes will only be shipped to an authorized hazardous waste management facilities. Biannual hazardous waste generator reports will be prepared and submitted to the DTSC. Copies of manifests, reports, waste analyses, and other documents will be kept on-site and will remain accessible for inspection for at least 3 years.
- Employees will be trained in hazardous waste handling procedures, spill contingencies, and waste minimization.
- Procedures will be developed to reduce the quantity of hazardous waste generated. Nonhazardous materials will be used instead of hazardous materials whenever practical, and wastes will be recycled whenever practical.
- Specifically, hazardous waste handling will include the following practices. Handling of hazardous wastes in this way will minimize the quantity of waste deposited to landfills:

Waste lubricating oil will be recovered and recycled by a waste oil recycling contractor, such as Evergreen Oil, Inc. Spent oil filters and oily rags will be recycled. Spent SCR catalysts will be recycled by the supplier, if possible, or disposed of at a State-certified treatment and disposal facility. Laboratory analysis wastes will be recycled or treated, if possible, or disposed of in a Class I landfill.

Waste handling facilities and activities at the SFERP facility will be subject to inspection by the SFDPH in accordance with Article 22 of the San Francisco Health Code to ensure handling of hazardous wastes in accordance with applicable laws and regulations. As discussed in Subsection 8.12, the facility will be required to file a Certificate of Registration and develop a Hazardous Materials Business Plan (overseen by the SFDPH) that documents all hazardous materials/wastes stored, used and disposed of at the site.

8.13.6.2.3 Hazardous Waste in Soil. Depending on the site mitigation implemented in accordance with Article 22A, soils containing hazardous constituents could be left in the soil, provided that containment measures (such as a cap) are put in place to prevent exposure to the hazardous materials under normal operating controls. In this case, the SFDPH would require preparation of a maintenance plan and implementation of specific activities that maintain the integrity of any containment measures used to prevent exposure to hazardous waste left in the soil and ensure that unacceptable exposure to the hazardous

waste does not occur. The activities would include requirements for notification of the SFDPH if the containment measures are to be disturbed; preparation of a health and safety plan; compliance with applicable state, federal, and local regulations; repair of any changes made to the controls that would allow exposure to hazardous materials; wetting of the soil and control of stormwater run-on and runoff from exposed soil areas; appropriate disposal of any excavated material; and regular reporting of maintenance activities to the SFDPH. These requirements would be included in a deed restriction for the site, as appropriate.

8.13.6.3 Facility Closure

When the SFERP facility is closed, both nonhazardous and hazardous wastes must be handled properly. Closure can be temporary or permanent. Temporary closure would be for a period of time greater than the time required for normal maintenance, including overhaul or replacement of the combustion turbines. Causes for temporary closure could be a disruption in the supply of natural gas, flooding of the site, or damage to the plant from earthquake, fire, storm, or other natural causes. Permanent closure would consist of a cessation in operations with no intent to restart operations and could result from the age of the plant, damage to the plant beyond repair, economic conditions, a policy decision by the City, or other unforeseen reasons. Handling of wastes for these two types of closure are discussed below.

8.13.6.3.1 Temporary Closure. For a temporary closure, where there is no release of hazardous materials, facility security will be deployed on a 24-hour basis, and the CEC will be notified. Depending on the length of shutdown necessary, a contingency plan for the temporary cessation of operations will be implemented. This plan will be prepared as described in the plant closure section. The plan will be developed to ensure conformance with all applicable LORS and the protection of public health and safety and the environment. The plan, depending on the expected duration of the shutdown, could include draining all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes will be disposed of according to applicable LORS, as discussed in Subsection 8.13.2.

Where the temporary closure is in response to facility damage, or where there is a release or threatened release of hazardous waste or materials into the environment, procedures will be followed as set forth in a hazardous materials business plan (HMBP), described in Subsection 8.12.8.2.1, or a risk management plan (RMP), described in Subsection 8.12.8.2.2. Procedures to be implemented include methods to control releases, notification of applicable authorities and the public, emergency response, and training for generating facility personnel in responding to and controlling releases of hazardous materials and hazardous waste. Once the immediate problem of the release is contained and cleaned up, temporary closure will proceed as described for a closure where there is no release of hazardous materials or waste.

8.13.6.3.2 Permanent Closure. When the facility is permanently closed, the SFPUC will prepare a closure plan in accordance with the requirements of Section 1154 of Article 21 of the San Francisco Health Code. The plan will address the need for further maintenance of the closed facility; address methods to ensure that the threat to public health and the environment from residual hazardous materials is eliminated; and address methods to ensure that hazardous materials used at the facility are appropriately removed, disposed of,

neutralized, or reused. The closure plan will be submitted to the SFDPH for approval a minimum of 30 days prior to closure and at that time, the SFDPH may add additional requirements for closure. The requirements specified in this closure plan will be incorporated into the general closure plan prepared for the facility that will attempt to maximize the recycling of facility components (see Section 4.0). Unused chemicals will be sold back to the suppliers or other purchasers or users. All equipment containing chemicals will be drained and shut down to protect public health and safety, and the environment. All nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. All hazardous wastes will be disposed of according to applicable LORS. The site will be secured 24 hours per day during the SFERP decommissioning activities.

8.13.7 Cumulative Impacts

The SFERP facility will generate nonhazardous solid waste that will add to the total waste generated in San Francisco County and in California. However, the facility will implement measures to comply with the City and County of San Francisco recycling goals of 75 percent recycling by 2010 and 100 percent recycling by 2020. Implementation of these measures would reduce the requirement for landfilling of wastes and there is adequate landfill capacity to accommodate the disposal of nonrecyclable materials until 2020 when all wastes would be recycled. With achievement of these recycling goals, it is estimated that SFERP will generate approximately 14,750 tons of solid waste for disposal during construction, and about 5 tons a year from operations until 100 percent recycling is achieved in 2020. Compared to the total amount of 700,000 to 800,000 tons of solid waste landfilled from San Francisco County in the year 2002 (Drew, 2003), the SFERP contribution will represent a minimal contribution to the total county waste generation. Therefore, the impact of the project on solid waste recycling and disposal capacity is not significant.

Hazardous waste generated will consist of waste lubricating oil, filters, and rags; spent SCR catalysts; and laboratory analysis wastes. The City will comply with the stringent LORS requirements for generation and handling of hazardous wastes, including source reduction, recycling, treatment and disposal. Further, the quantities of hazardous waste generated during construction and operation are small. Compared to the approximately 20 million cubic yard existing and anticipated capacity of the existing hazardous waste disposal facilities, the disposal capacity in California for hazardous wastes is more than adequate. Therefore, the effect of SFERP on hazardous waste recycling, treatment, and disposal capability is not significant.

8.13.8 Monitoring

The City will incorporate reporting requirements into the waste collection contract requiring reporting to demonstrate compliance with City waste diversion goals. Compliance with requirements for discharge of nonhazardous wastewater during construction and operation would be tracked through regular reporting to the San Francisco Department of Public Works in accordance with Article 4.1 of the Public Works Code, described in Subsection 8.14, Water Resources.

Hazardous waste reduction efforts will be documented in the hazardous waste performance report required by the Hazardous Waste Source Reduction and Management Review Act of 1989, if threshold quantities of hazardous waste are generated. Hazardous waste handling

at the site will be subject to regular inspections by the SFDPH, the CUPA (Certified Unified Program Agency) for the City and County of San Francisco, which could cite the facility for noncompliance with applicable regulatory requirements. Any hazardous wastes shipped for off-site disposal or treatment will be manifested in accordance with state and federal laws, and the DTSC will confirm legal disposal or recycling of the hazardous wastes through reconciliation of waste manifests.

Compliance with site mitigation requirements will be documented in the certification report submitted to the SFDPH, DTSC, and SFBRWQCB for review and approval upon completion of the site mitigation. If containment measures (such as a cap) are instituted to prevent exposure to the hazardous wastes left in the soil and groundwater during operation, requirements would include implementation of a maintenance plan and specific activities described in Subsection 8.13.6.2.3, and notification of the SFDPH if the containment measures are to be disturbed. These measures would provide the monitoring required to ensure that unacceptable exposure to hazardous wastes in the soil and groundwater does not occur during operation.

8.13.9 Involved Agencies

Several agencies, including USEPA at the federal level and the DTSC and SFBRWQCB at the state level, regulate nonhazardous and hazardous waste and will be involved in the regulation of the waste generated by the SFERP. The waste laws, however, are administered and enforced primarily through the SFDPH, which is the designated CUPA for San Francisco. Recycling of non-hazardous waste is managed by the San Francisco Department of the Environment. The persons to contact for nonhazardous and hazardous waste management are listed in Table 8.13-6.

TABLE 8.13-6
Agency Contacts for SFERP Waste Management

Topic	Agency	Address	Contact	Title	Telephone
Nonhazardous Waste					
Solid Waste	San Francisco Department of Public Health	1390 Market St., Suite 210 San Francisco, CA 94102	Henry Louie	Local Enforcement Agency Program Manager	(415) 252-3980
Recycling	San Francisco Department of the Environment	11 Grove St. San Francisco, CA	Kevin Drew	Residential and Special Projects Recycling Coordinator	(415) 355-3700
Hazardous Waste					
Hazardous Waste Compliance and Inspections	San Francisco Department of Public Health	1390 Market St., Suite 210 San Francisco, CA 94102	Sue Cone	Program Manager	(415) 252-3991

TABLE 8.13-6
Agency Contacts for SFERP Waste Management

Topic	Agency	Address	Contact	Title	Telephone
Article 22A Compliance	San Francisco Department of Public Health	1390 Market St., Suite 210 San Francisco, CA 94102	Scott Nakamura	Program Manager	(415) 252-3994

8.13.10 Permits Required and Permit Schedule.

The storage of hazardous wastes at the SFERP facility would be included in the HMBP submitted to the SFDPH as described in Section 8.12, Hazardous Materials. In addition, the San Francisco Fire Department could require the permits listed in Table 8.13-7.

TABLE 8.13-7
Permits Required and Permit Schedule for SFERP Waste Management

Permit	Applicability	Schedule for Permit
Hazardous Materials Use and Storage Permit	California Fire Code requires that businesses obtain permits for the use and storage of specified hazardous materials.	Before storing regulated hazardous wastes at the site.
Asbestos Fire Permit	California Fire Code requires an asbestos fire permit for construction, alteration, or demolition of buildings that contain asbestos or asbestos-containing materials which were used as a feature of the building's fire resistance.	24 hours prior to commencement and closure of asbestos removal operations.
Tank Removal Permit	The San Francisco Fire Department requires a permit for removal of tanks.	Prior to removal of an above ground storage tank.

8.13.11 References

California Air Resources Board, Regulatory Advisory. 2002. *Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations.* July 29.

CIWMB (California Integrated Waste Management Board). 2003a. "Inventory of Solid Waste Facilities Violating State Minimum Standards." November 14.

CIWMB. 2003b. Solid Waste Information System (SWIS) Database. December 16.

Drew, K. 2003. Personal communication between K. Drew, Residential and Special Projects Recycling Coordinator for the San Francisco Department of the Environment, and Mary McDonald of Orion Environmental Associates. December 16.

DTSC (Department of Toxic Substance Control). 2003a. *California Commercial Offsite Hazardous Waste Management Facilities.* October 20.

DTSC (Department of Toxic Substances Control). 2003b. Hazardous Waste Facility Permit for Chemical Waste Management, Incorporated, Kettlemen Hills Facility. Permit Number 02-SAC-03. June 16.

Gius, F. 2004. Email from F. Gius of the Department of Toxic Substances Control to Mary McDonald of Orion Environmental Associates. February 11.

Malatesta, M. 2003. Personal communication between M. Malatesta, Operations Manager of the Roll Off Division, Golden Gate Disposal and Recycling, and Mary McDonald of Orion Environmental Associates. December 18.

St. John, M. 2003. Personal communication between M. St. John, Environmental Coordinator and Regulatory Specialist for Altamont Landfill, and Mary McDonald of Orion Environmental Associates. December 16.

VISTA Information Solutions, 2000. *Site Assessment Report Plus.* February 11.

SUBSECTION 8.14

Water Resources

8.14 Water Resources

8.14.1 Introduction

This subsection evaluates the effect of the San Francisco Electric Reliability Project (SFERP) on water resources. Subsection 8.14.2 provides a brief introduction to San Francisco's combined sewer system, which is atypical in California and an important consideration in this subsection. Subsection 8.14.3 presents the LORS compliance strategy. Subsection 8.14.4 describes the affected environment. Subsection 8.14.5 presents the project's proposed water usage and wastewater disposal characteristics, and Subsection 8.14.6 discusses the project's effects on water resources. Mitigation is discussed in Subsection 8.14.7. Subsection 8.14.8 provides the proposed monitoring plans and compliance verification procedures. Subsection 8.14.9 discusses cumulative impacts. Subsection 8.14.10 lists the permits required and agency contacts. Subsection 8.14.11 provides the references consulted in preparing this subsection.

Water resources evaluated for potential effects by the proposed SFERP include the following, and are addressed in this subsection:

- Effects on water supply
- Effects on surface waters
- Effect of stormwater
- Effects on groundwater recharge, degradation, or depletion
- Effects on flooding

8.14.2 Background

The City of San Francisco (City) is the only major municipality in California with a combined sewer system, and it serves nearly the entire City. This means that throughout the City, domestic sewage, industrial wastewater, and stormwater runoff are collected in the same set of pipes where they are combined and transported to the same wastewater treatment facilities for treatment and disposal. Most other communities in California have a separated sewer system: one system for domestic sewage and industrial wastewater and another system for stormwater.

The City combined sewer system is subject to the regulations of, and permitted under, the National Pollutant Discharge Elimination System (NPDES) program of the Clean Water Act for the treatment and disposal of the combined wastewater. However, during wet weather, the NPDES permit indicates that the City's combined sewer system facilities are regulated under the Federal Combined Sewer Overflow Control Policy, and not the same regulations for publicly-owned treatment works or for stormwater as other California municipalities with separate systems. The City's combined sewer system is further described in Subsection 8.14.4, and federal, state, and local regulations applicable to the SFERP are discussed in the next section, Subsection 8.14.3.

8.14.3 Applicable Laws, Ordinances, Regulations, and Standards

Federal, state, and local laws, ordinances, regulations, and standards (LORS) applicable to water resources aspects of the SFERP are discussed in this subsection and summarized in Table 8.14-1.

TABLE 8.14-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Water Resources

LORS	Applicability	How Conformance Is Achieved
Federal		
Clean Water Act (CWA) / Water Pollution Control Act. P.L. 92-500, 1972; amended by Water Quality Act of 1987, P.L. 100-4 (33 USC 466 et seq.); National Pollutant Discharge Elimination System (NPDES) (CWA, Section 402); Toxic and Pretreatment Effluent Standards (CWA, Section 307)	Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance with an NPDES permit. Applies to all wastewater discharges, including industrial wastewater, stormwater runoff and dewatering, during both construction and operation. Sets forth pretreatment requirements for the industrial discharges into publicly-owned treatment works.	Compliance with state implementation requirements as indicated by the California Regional Water Quality Control Board, San Francisco Bay Region (see below under "State").
State		
Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code, Sections 13000-14050), including Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan)	Implements and enforces the federal NPDES permit program through conformance with beneficial uses and water quality objectives in the Basin Plan as well as conformance with any applicable Total Maximum Daily Load requirements and industrial pretreatment requirements.	Operational discharges of industrial and sanitary wastewater streams are conveyed to the City's combined sewer system for treatment and disposal; discharges from the City's combined sewer system to the Bay are regulated under the existing NPDES permit. Operational discharges of stormwater runoff from the site are conveyed to the City's combined sewer system for treatment and disposal; discharges to the Bay from the City's combined sewer system are regulated under the existing NPDES permit. Construction discharges of stormwater runoff from the site are conveyed to the City's combined sewer system for treatment and disposal; discharges to the Bay from the City's combined sewer system are regulated under the existing NPDES permit.
California Environmental Quality Act (CEQA) (Public Resources Code, 21000 et seq. and Guidelines, 14 Cal. Code Reg. 15000 et seq.)	Identifies potential impacts to water quality and hydrology and mitigation measures for those impacts; discloses this information to decision makers and the public.	The California Energy Commission (CEC) Preliminary and Final Staff Assessments are the CEQA-equivalent documents under the Warren-Alquist Act.
California Water Code §13550 et seq. and State Water Resources Control Board Resolution 75-58	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.	CA Water Code §13550 et seq. provides that use of potable water for specified uses is a prohibited waste of water resources when recycled water is currently available, as defined in that section. The SFERP proposes to use recycled water for process and cooling water and is, therefore, in conformance with these code sections. Res. No. 75-58 applies only to use of inland surface waters for cooling; but because the SFERP would use recycled water for cooling, this does not apply to this project.

TABLE 8.14-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Water Resources

LORS	Applicability	How Conformance Is Achieved
Title 22 of the CCR (Division 4, Chapter 15)	Sets forth requirements for treatment and quality of recycled water for cooling	Recycled water will be disinfected tertiary recycled water, in conformance with Title 22 requirements.
Local		
San Francisco Public Works Code, Article 4.1, Industrial Waste	Regulates all discharges to the City's combined sewer system, including industrial wastewater, stormwater runoff, and dewatering effluent.	The Applicant will comply with Article 4.1 for all discharges to the combined sewer system and will obtain a Class I discharge permit from the City's to discharge industrial wastewater to the combined sewer system. The Applicant will comply with all permit conditions, including the following: discharge limitations, pretreatment requirements, peak flow restrictions, dewatering discharges, payment of fees, and monitoring and reporting requirements.
San Francisco Department of Public Works Order No. 158170	Specifies industrial waste discharge limits on wastewater discharges into the City's sewerage system	Compliance with the Class I discharge permit from the City's pursuant to Article 4.1 of the Public Works Code
Reclaimed Water Use Ordinance Article 22 to Part II, Chapter X of the San Francisco Public Works Code	Requires installation of dual plumbing and use of recycled water, when it is available, for projects over 40,000 square feet and within the reclaimed water area.	SFERP is within the designated reclaimed water area and would involve over 40,000 square feet of new construction. The proposed SFERP includes dual plumbing and is to use recycled water for process and cooling water, and is therefore in conformance with the Ordinance.

8.14.3.1 Federal Clean Water Act

The federal Clean Water Act and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (USEPA), was established "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA established the National Pollutant Discharge Elimination System (NPDES) program to protect water quality of receiving waters. Under the Clean Water Act, Section 402, discharge of pollutants to receiving waters is prohibited unless the discharge is in compliance with an NPDES permit. In California, the USEPA has delegated the implementation and enforcement of the NPDES program to the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards. Surface and ground water in the project vicinity are under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). Discharges of wastewater and stormwater from SFERP would flow to the City's Southeast Water Pollution Control Plant (SEWPCP), which operates under an NPDES permit issued by the SFBRWQCB.

In addition, Section 307 of the Clean Water Act requires pretreatment of industrial discharges into publicly-owned treatment works. Industrial discharges from the SFERP would be subject to these requirements, as implemented and enforced by the City under San Francisco Public

Works Code, Article 4.1. Because the industrial pretreatment standards would be enforced by the City, they are discussed below under local regulations.

8.14.3.2 State

8.14.3.2.1 Porter-Cologne Water Quality Control Act and the Basin Plan. The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) governs the regulation of water quality within California and establishes the authority of the SWRCB and the nine Regional Boards. The SFBRWQCB established regulatory standards and objectives for water quality in the Bay in the *Water Quality Control Plan for the San Francisco Bay Basin*, commonly referred to as the "Basin Plan" (California Regional Water Quality Control Board, 1995). The Basin Plan identifies existing and potential beneficial uses and provides numerical and narrative water quality objectives designed to protect those uses. The SFBRWQCB considers the beneficial uses of receiving water in establishing NPDES permit requirements in the San Francisco Bay region, including the permit covering the Southeast Water Pollution Control Plant.

The following existing beneficial uses are identified for San Francisco Bay, Central and Lower portions: ocean, commercial and sport fishing; estuarine habitat; industrial service supply; fish migration; navigation; preservation of rare and endangered species; water-contact recreation; non-contact water recreation; shellfish harvesting; and wildlife habitat. Central San Francisco Bay also is identified as having industrial process supply and fish spawning as existing beneficial uses. No "potential" beneficial uses are identified for these waters (RWQCB, 1995).

8.14.3.2.2 Clean Water Act, Section 303d, Impaired Water Bodies. In accordance with Section 303(d) of the Clean Water Act, each state must present the USEPA with a list of impaired water bodies. The SWRCB has listed San Francisco Bay, Central Bay portion, as an *impaired water body*. Impaired waters are defined as those that do not meet water quality standards, even after point sources of pollution have implemented pollution control technology. The law requires the development of action plans, known as Total Maximum Daily Loads (TMDLs), to improve water quality of impaired water bodies. The TMDL is a calculation of the total amount of a pollutant that a water body can receive and still meet water quality objectives for a pollutant identified as causing impairment. The TMDL report allocates permissible quantities for discharge from specific sources. The pollutants that have been identified as causing impairment in San Francisco Bay, Central Bay portion, include chlordane, DDT, diazinon, dieldrin, dioxin compounds, furan compounds, mercury, polynuclear aromatic hydrocarbons, exotic species, polychlorinated biphenyls, and selenium (RWQCB, 2003). The SFBRWQCB is developing reports for these pollutants, and subsequent amendments will be made to the Basin Plan to adopt the TMDL and all its related parts. Wastewater discharges from the SFERP would not result in the addition of any of these identified pollutants to the combined sewer system.

8.14.3.2.3 Industrial Stormwater NPDES Permit. The SWRCB implements regulations under the federal Clean Water Act requiring that point source discharges (a point source discharge of stormwater is a flow of rainfall runoff in some kind of discrete conveyance such as a pipe, ditch, channel, or swale) of stormwater associated with industrial activity that discharge either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit (SWRCB, 1997). The SWRCB has issued Waste Discharge Requirements (WDRs) for discharges of stormwater associated with industrial activities, such as the proposed project, and excluding construction activities. However, similar to existing

conditions, the proposed site would be graded and constructed to direct stormwater runoff directly to the City combined sewer system. No stormwater would flow directly to the Bay or to a separate storm sewer. Therefore, this permit would not apply to the project.

However, stormwater discharges from the SFERP site to the City combined sewer system would be subject to the requirements of the City and must be in compliance with the nine minimum controls described in the Federal Combined Sewer Overflow Control Policy (CSO Policy) and specified in the City's NPDES permit. The minimum controls include development and implementation of a pollution prevention program that would be applicable to the SFERP. The City's pollution prevention program includes best management practices to minimize the amount of pollutants carried by stormwater into the combined sewer system.

8.14.3.2.4 Construction Stormwater NPDES Permit. The federal Clean Water Act effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with an NPDES permit. The SWRCB is the permitting authority in California and has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (General Construction Permit; SWRCB, 1999a) that applies to projects resulting in one or more acres of soil disturbance. Although construction of the proposed project would result in disturbance of more than one acre of soil, this permit would not apply to the proposed SFERP because the construction site would be graded to direct stormwater runoff directly to the City's combined sewer system. No stormwater would flow directly to the Bay or to a separate storm sewer system.

However, stormwater discharges from the construction site to the City's combined sewer system would be subject to the requirements of the City's permit and must be in compliance with the nine minimum controls described in the Federal Combined Sewer Overflow Control Policy (CSO Policy) and specified in the City's NPDES permit. The minimum controls include development and implementation of a pollution prevention program that would be applicable to the SFERP. At a minimum, the City requires that the project sponsor develop and implement an erosion and sediment control plan to reduce the impact of runoff from the construction site. The erosion and sediment control plan must be reviewed and approved by the City prior to implementation, and the City will conduct period inspections to ensure compliance with the erosion and sediment control plan (Lee, 2004).

8.14.3.2.5 California Environmental Quality Act. The California Environmental Quality Act (CEQA) requires that projects carried out or approved by California public agencies be evaluated for their potential to cause adverse environmental impacts, and that impacts be mitigated to the extent feasible. The CEQA evaluation of impacts must cover all aspects of the environment, including water resources, hydrology and water quality. CEQA assessment of water resource impacts includes analysis of water quality standards or waste discharge requirements, depletion of groundwater supplies or recharge; alteration of drainage patterns; increase in runoff; degradation of water quality of surface or ground waters; and flooding hazard. The California Energy Commission's (CEC's) Preliminary and Final Staff Assessments are CEQA-equivalent documents under the Warren-Alquist Act.

8.14.3.2.6 California Water Code Sections 13550, 13551, 461, and SWRCB Resolution No. 75-58. These water code sections and policy statements encourage the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.

California Water Code 13550, et seq., provides that use of potable water for specified uses is a prohibited waste of water resources when recycled water is available. The SFERP proposes to use recycled water for process and cooling water, as well as for dual plumbing, and therefore is in conformance with these code sections. State Water Resources Control Board Resolution 75-58 sets forth the state's water quality control policy on the use and disposal of inland waters used for power plant cooling; this resolution applies only to uses of inland surface waters for cooling water. The SFERP proposes to use recycled water, not inland surface waters. Therefore, this resolution does not apply to the SFERP.

8.14.3.2.7 Title 22 of the California Code of Regulations. Title 22 addresses the treatment and use of recycled water; in particular Section 60306 sets forth the criteria for the use of recycled water for cooling. Such cooling water is defined as disinfected tertiary recycled water in Section 60401.230. The recycled water produced for this project would meet all Title 22 requirements. Therefore, the SFERP would be in conformance with this regulation.

8.14.3.3 Local Policies—City and County of San Francisco

8.14.3.3.1 Article 4.1 of the San Francisco Public Works Code and San Francisco Department of Public Works Order No. 158170. The Clean Water Act requires that publicly-owned treatment works regulate the discharge of industrial wastes into a sewerage system subject to an NPDES permit. Accordingly, the City has adopted detailed permit requirements for industrial dischargers. The discharge of any wastewater to the City's combined sewer system would be subject to the requirements of Article 4.1 of the San Francisco Public Works Code, which regulates the quantity and quality of discharges to the combined sewer system. Order No. 158170 of the San Francisco Public Works Department provides additional industrial waste discharge limits to augment those listed in Article 4.1 of the San Francisco Public Works Code. In accordance with these regulations, the discharge would be required to meet the numeric limitations specified in Table 8.14-2.

TABLE 8.14-2
Limitations for Industrial Discharges to San Francisco Combined Sewer System

Parameter	Unit	Discharge Limit
pH[a,b]	standard units	6.0 to 9.5
Dissolved sulfides[a,b]	milligram per liter	0.5
Temperature[a,b]	degrees Fahrenheit	125
Hydrocarbon oil and grease[a,b]	milligram per liter	100
Total recoverable oil and grease[a,c]	milligram per liter	300
Arsenic, as total[d,e]	milligram per liter	4.0
Cadmium, as total[d,e]	milligram per liter	0.5
Chromium, as total[d,e]	milligram per liter	5.0
Copper, as total[d,e]	milligram per liter	4.0
Lead, as total[d,e]	milligram per liter	1.5
Mercury, as total[d,e]	milligram per liter	0.05

TABLE 8.14-2
Limitations for Industrial Discharges to San Francisco Combined Sewer System

Parameter	Unit	Discharge Limit
Nickel, as total[d,e]	milligram per liter	2.0
Silver, as total[d,e]	milligram per liter	0.6
Zinc, as total[d,e]	milligram per liter	7.0
Phenols[d,e]	milligram per liter	23.0
Cyanide, as total[d,e]	milligram per liter	1.0

Notes:
[a] Article 4.1 of the San Francisco Public Works Code, Section 123.
[b] Limitation based on any grab sample. Wastewater shall not at any time exceed the specified numerical limitation.
[c] The limitation for total recoverable oil and grease is based on a composite sample of wastewater discharge generated over a production week.
[d] City and County of San Francisco, Department of Public Works Order No. 158170.
[e] Limit based on any 24-hour representative, composite sample.

In addition to the numeric requirements of Table 8.14-2, Article 4.1 also prohibits the discharge of other materials that could obstruct or damage the sewer system; cause a nuisance; interfere with the operation, maintenance, or repair of the sewer system; or would directly or indirectly cause a violation of the City's NPDES permit.

In accordance with Article 4.1, the SFERP would be required to obtain a Class I discharge permit from the City. The Class I permit would specify the detailed, project-specific requirements applicable to the SFERP, including pretreatment standards, flow restrictions (e.g., peak discharges, timing of discharges), and sampling, monitoring, and reporting requirements. The Class I permit may also require the control of stormwater runoff that enters the combined sewer system. The permit would be issued for a fixed time period, not to exceed 5 years. Reports, including a description of any violations, remedial measures taken, or any process changes, are required to be submitted to the City on a quarterly basis.

Pretreatment standards tier from federal (Clean Water Act) requirements, contained in 40 CFR Part 423 (Steam Electric Power Generating Point Source Category). The specific section applicable to new sources is Section 423.15. New source performance standards for industrial pretreatment include limitations on pH, prohibition of discharges containing polychlorinated biphenyl compounds, and numeric limits for low-volume waste and chemical metal cleaning waste. The regulations also include limitations for priority pollutants that are added to the process for cooling tower maintenance. No products containing priority pollutants are proposed to be incorporated into the process for cooling tower maintenance.

Numeric pretreatment limits are established for low-volume waste and chemical metal cleaning waste. Low volume waste, if from one source, is wastewater from all sources except those for which specific limitations are otherwise established. Low volume wastes include, but are not limited to, wastewaters from wet scrubber air pollution control systems, ion exchange water treatment systems, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes, and recirculating house

service water systems. Sanitary and air conditioning are not included. The effluent limitations specified in Table 8.14-3 are applicable to discharge of low volume waste from the SFERP.

"Chemical metal cleaning waste" means any wastewater resulting from cleaning any metal process equipment (with or without chemical cleaning compounds). The effluent limitations specified in Table 8.14-4 are applicable to discharges of chemical metal cleaning wastes.

TABLE 8.14-3
Effluent Limitations Applicable to Discharges of Low Volume Waste

Pollutant	Daily Maximum (mg/L)	Maximum 30-day Average (mg/L)
Total Suspended Solids (TSS)	100.0	30.0
Oil and Grease	20.0	15.0

TABLE 8.14-4
Effluent Limitations Applicable to Discharges of Chemical Metal Cleaning Wastes

Pollutant	Daily Maximum (mg/L)	Maximum 30-day Average (mg/L)
Total Suspended Solids (TSS)	100.0	30.0
Oil and Grease	20.0	15.0
Copper, total	1.0	1.0
Iron, total	1.0	1.0

Article 4.1 also requires a permit from the City for discharge of groundwater or water from dewatering facilities into the combined sewer system. This permit would be applicable to the SFERP if dewatering is required during construction. The permit for groundwater discharge would contain appropriate discharge standards and may require installation of meters to measure the volume of the discharge.

8.14.3.3.2 Reclaimed Water Use Ordinance. The City has adopted the Reclaimed Water Use Ordinance (Ordinances 390-91 and 391-91, approved November 7, 1991), which added Article 22 to Part II, Chapter X of the San Francisco Municipal Code (Public Works Code). If a non-residential project is within a reclaimed water area, is over 40,000 square feet, and requires a site permit, building permit, or other authorization, the ordinance mandates the installation of dual plumbing and the use of recycled water, when it is available. Dual plumbing is to be designed to service uses that could employ recycled water (e.g., toilets). The ordinance also requires that owners, operators, or managers of all such development projects register their project with the San Francisco Water Department. The Water Department will then issue a certificate of intention to use reclaimed water, and reclaimed water shall be used unless the Water Department issues a certificate exempting compliance because: 1) reclaimed water is not

available, 2) an alternative water supply is to be used, or 3) the sponsor has shown that the use of reclaimed water is not appropriate. The appropriate use of reclaimed water would reduce the project's potable water consumption.

The proposed project is located within a designated reclaimed water area and would involve development of approximately 4.5 acres (196,020 square feet), exceeding the 40,000-square-foot threshold. Therefore, the SFERP would be subject to this ordinance and dual plumbing will be included in the plant design. Conformance will be achieved through use of recycled water, to be available to the SFERP upon start-up of operations.

8.14.3.3.3 San Francisco General Plan Policies. Two elements of the San Francisco General Plan–the Environmental Protection and the Community Safety Elements—include policies related to water resources relevant to the SFERP. The Environmental Protection Element (1995) addresses the impact of urbanization on the natural environment, and the Community Safety Element (1997) aims to reduce future loss of life, injuries, property loss, environmental damage, and social and economic disruption from natural disasters. In addition, the project site is located within the Central Waterfront Specific Area, which has specific policies based on the geographic location within the City. Table 8.14-5 summarizes the applicable water resource goals and policies from the San Francisco General Plan and the project's conformance with those goals and policies.

TABLE 8.14-5
San Francisco General Plan Water Resources Policies Applicable to the SFERP

Element	Goal/Policy	Conformance
Environmental Protection	Policy 3.3: Implement plans to improve sewage treatment and halt pollution of the Bay and Ocean.	Obtaining a City Class I permit and conforming to requirements of Article 4.1 of the San Francisco Public Works Code and San Francisco Department of Public Works Order No. 158170 would protect water quality of the Bay.
	Policy 3.1: Cooperate with and otherwise support regulatory programs of existing regional, State, and Federal agencies dealing with the Bay, Ocean, and Shorelines.	Same as above.
	Policy 5.2: Exercise controls over development to correspond to the capabilities of the water supply and distribution system.	Use of recycled water for industrial process and cooling water as well as for dual plumbing would minimize additional demands on the water supply and distribution system.
	Objective 6: Conserve and protect the fresh water resource.	Use of recycled water for industrial process and cooling water as well as for dual plumbing would conserve potable water for domestic uses.
	Policy 6.2: Encourage and promote research on the necessity and feasibility of water reclamation.	Use of recycled water for industrial process and cooling water as well as for dual plumbing would demonstrate to other industries the feasibility of water reclamation and encourage other industries to consider its use.

TABLE 8.14-5
San Francisco General Plan Water Resources Policies Applicable to the SFERP

Element	Goal/Policy	Conformance
Community Safety Element	Policy 2.9: Consider information about geologic hazards whenever City decisions that will influence land use, building density, building configurations or infrastructure are made.	Information regarding potential for flooding or inundation from tsunami at the project site for the SFERP is considered in this AFC.
Central Waterfront Specific Area Plan	Objective 9: Provide public access and recreational opportunities along the shoreline; and Policy 9.1: Maintain and improve the quality of existing shoreline recreational areas at China Basin Channel, Agua Vista Park, Warm Water Cove and Islais Creek.	The SFERP would use recycled water for industrial process and cooling water rather than Bay water, thereby precluding the need for infrastructure development along the shoreline.

Source: San Francisco Planning Department, 1996. San Francisco General Plan. Environmental Protection Element (1997), Community Safety Element (1995), and Central Waterfront Specific Area Plan (1998).

8.14.4 Affected Environment—Hydrologic Setting

8.14.4.1 Water Features, Rainfall and Drainage

The SFERP site is located along the shoreline directly adjacent to San Francisco Bay near Pier 72. The major water feature in the project vicinity, in addition to San Francisco Bay itself, is Islais Creek Channel, a tidal inlet of the Bay located about 0.5 mile south of the project site. The channel was originally the outflow of Islais Creek. Islais Creek was filled with blasted rock during the 1940s and was one of the last creeks in the City to be filled. Urban development has resulted in culverting the creek and diverting natural creek flows and drainage to the combined sewer system. Average annual precipitation in this part of San Francisco is about 21 inches, with nearly all annual rainfall occurring from November through April. Figure 8.14-1 (figures are located at the end of this subsection) shows the water features in the project vicinity.

Nearly all freshwater flow to the Bay and stormwater runoff from the east side of San Francisco, including the project site, has been diverted to the City's combined sewer system. The 4.5-acre project site is currently 100 percent impervious surfaces, and all drainage from the site flows to the City's combined sewer system. As described earlier, the City is almost entirely served by a combined sewer system, which collects and transports both wastewater (sewage and industrial discharges) and stormwater runoff in the same set of pipes. During dry weather, wastewater flows consist mainly of municipal (also referred to as sanitary sewage) and industrial wastewater. Dry weather flows to the combined sewer system along the east side of the City are transported to the Southeast Water Pollution Control Plant (SEWPCP) on Phelps Street, about 0.75 mile southwest of the project site, for treatment and subsequent discharge to the Bay through the deep water outfall at Pier 80 (east of the project site). During wet weather, the volume of wastewater in the City's combined sewer system greatly increases when stormwater runoff mixes with the municipal and industrial wastewater. The wet weather flows are either treated at the SEWPCP or wet weather treatment facilities, or retained in storage and transport

boxes for later treatment. Treated wastewater is discharged to the Bay through various outfalls and overflow structures in compliance with an NPDES permit from the California Regional Water Quality Control Board (RWQCB, 2002).

Due to the large variation in volume of wastewater discharged to the combined sewer system, there are variations in the treatment and disposal of the wastewater depending on the volume. During dry weather when wastewater flow volumes are low, wastewater is treated to a secondary level at the SEWPCP and discharged to the Bay through the deep water Pier 80 Outfall (secondary treatment involves treatment of wastewater or sewage of organic matter using biological and chemical processes. This is a higher level of treatment than primary treatment, which is removal of floating and settleable solids using physical operations such as screening and sedimentation. Secondary treatment is less intensive than tertiary treatment, in which additional chemical and biological treatment is used to remove pathogens, generally for recycled [non-potable] water uses). Annual average wastewater flow during dry weather is about 68 million gallons per day (mgd). During wet weather, the SEWPCP provides secondary treatment to increased wet weather flows up to the capacity of 150 mgd, and can also treat up to an additional 100 mgd to a primary treatment standard. Wet weather discharges in the project area occur through the Pier 80 Outfall or the Quint Street Outfall (on the south bank of Islais Creek one block west of the Third Street bridge).

During periods of extreme wet weather, discharges to the Bay also occur as combined sewer overflows (CSOs) at CSO structures located all along the City's waterfront. Two CSO structures are located south of the project site at the western head end of Islais Creek, and two CSO structures are located just north of the project site at 20th and 22nd streets. The combined sewer system is designed such that discharges from the CSO structures in this part of the City occur on average about 10 times per year. Discharges through the CSO structures, consisting of about 6 percent sewage and 94 percent stormwater, undergo flow-through treatment prior to discharge to the Bay to remove settleable solids and floatable materials (approximating primary treatment).

8.14.4.2 Potable Water Source

Potable water delivered to San Francisco is from the Hetch Hetchy water supply system and provided by the San Francisco Public Utilities Commission (SFPUC). The raw water source originates outside the City, with about 85 percent originating from the Tuolumne River watershed in the Sierra Nevada and about 15 percent from local Bay area watersheds. Groundwater in the project area has not been developed for domestic uses and may not be suitable for potable purposes.

8.14.4.3 Surface Waters

There are no surface waters or wetlands within the project site boundaries, and no stream crossings would be required. San Francisco Bay, including its associated inlets, is the major water feature closest to the project area. Between Piers 72 and 80, about 1,000 feet southeast of the site, Warm Water Cove Park is a public open space area next to the Bay where sport fishing, water-contact recreation and non-contact water recreation opportunities occur depending on tidal water levels. The Islais Creek Channel is used for small-vessel boating and other non-contact water recreation. At the mouth of Islais Creek on the south side, there is an existing wetland area with wildlife habitat (San Francisco Planning Department, 2001).

Historically, Islais Creek was the confluence of several small creeks (one of which is still extant in Glen Canyon) that carried runoff from the southeastern portion of San Francisco and entered the Bay just west of the western end of the existing tidal inlet. Urban development and alterations to the drainage system resulted in culverting of Islais Creek and channeling most of the stream flow from Islais Creek into the City's combined sewer system. Currently, surface inflow to Islais Creek Channel occurs during the rainy season from treated wastewater discharged from the combined sewer system through the Quint Street outfall and two CSO structures along the creek channel as well as from direct stormwater runoff from areas adjacent to the creek. The western portion of Islais Creek (west of Third Street) is listed as a Toxic Hot Spot because of impacts on aquatic life due to contaminated sediment (SWRCB, 1999b). Islais Creek is also listed as an impaired water body due to sediment contaminated with ammonia, chlordane, dieldrin, edosulfan sulfate, hydrogen sulfide, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs), with the source of impairment attributed to industrial point sources and combined sewer overflow (RWQCB, 2003). SFPUC has not accepted the listing findings and has objected to the accuracy of the data and conclusions used by the SWRCB and RWQCB. Discussions between SFPUC and RWQCB regarding these assessments and remedial activities are ongoing.

8.14.4.4 Groundwater

Groundwater underlying the project area is part of the Islais Creek groundwater basin. This basin covers approximately 5,600 acres that historically were part of the Islais Creek drainage area, extending roughly from Twin Peaks to the Bay. The alluvial thickness ranges from zero feet where bedrock is exposed to 200 feet near the Bay. Unconsolidated sediments are made up of a combination of Colma Formation sediments and undifferentiated alluvial deposits. Bay mud occurs in a large portion of the basin, and artificial fill has been placed over the Bay margin. In general, the water table is shallow and the groundwater flow direction is from the bedrock ridges towards the valley center and then toward the Bay (San Francisco Planning Department, 1997).

Historically, there were numerous wells developed in this basin for irrigation and domestic, uses, but currently there are no groundwater wells used for potable water in the project area. The groundwater quality in this basin is generally unknown, but in the industrial area east of Highway 101, there is a high likelihood that groundwater quality has been affected by current and former industrial land uses.

At the project site, depth to groundwater ranges between 3.5 feet below ground surface (bgs) in the central part of the site to up to 21 feet bgs adjacent to the Bay. It appears that the fill and the fractured bedrock act as a single water-bearing unit. On the eastern side of the site, the fill is underlain by a thick sequence of Bay Mud that inhibits vertical movement of groundwater (Mirant, 2000).

8.14.4.5 Flooding Potential

The project site is located at an elevation of approximately 26 feet above mean sea level and more than 1,000 feet from the shoreline. The 100-year tide elevation, including the effect of wind-generated wave runup at MHHW (MHHW = mean higher high water, or the average level of the higher of the two daily high tides) is 13.0 feet above mean sea level (Mirant, 2000). Based on this, the potential for flooding at the project site is low. This is consistent with the San Francisco Community Safety Element, which indicates that there are no areas prone to surface flooding in San Francisco (San Francisco Planning Department, Community Safety Element, 1995).

Tsunamis are large waves in the ocean generated by earthquakes, coastal or submarine landslides, or volcanoes. Damaging tsunamis are not common on the California coast. Most California tsunamis are associated with distant earthquakes (most likely those in Alaska or South America), not with local earthquakes. Devastating tsunamis have not occurred in historic times in the Bay area. Because of the lack of reliable information about the kind of tsunami runups that have occurred in the prehistoric past, there is considerable uncertainty over the extent of tsunami runup that could occur. There is ongoing research into the potential tsunami run-up in California. The project site is located outside of the area of potential tsunami inundation identified in the San Francisco General Plan Community Safety Element. The tsunami map indicates inundation areas from a 20-foot tsunami (wave height) at the Golden Gate, the maximum probable tsunami expected to occur once every 100 years, on average (San Francisco Planning Department, Community Safety Element, 1995). Although seiches and tsunamis can occur and cause tidal surges in San Francisco Bay, the Bay greatly attenuates tsunamis that might reach the Golden Gate area and these events are extremely rare.

8.14.5 Project Water Usage and Wastewater Disposal Characteristics

8.14.5.1 Water Usage and Sources

This subsection characterizes the sources and quality of water needed for power generation and other operations at SFERP. Average and maximum daily and annual water demand are provided in Table 8.14-6.

TABLE 8.14-6
Daily and Annual Water Usage for SFERP Operations

		Daily Use (gpm[a])		Annual Use (AFY[b])	
Water Use	**Water Source**	**Average**	**Maximum**	**Average**	**Maximum**
Process and Cooling Water	Disinfected tertiary recycled water, supplied by the City, SFPUC	239	296	132	163
Equipment Wash Water	Disinfected tertiary recycled water, supplied by the City, SFPUC	1	2	1.6	3.2
Potable Water Service	Hetch Hetchy water supply system	1	2	1.6	3.2
Fire Protection	The City's Auxiliary Water Supply System or Hetch Hetchy water supply system	0	1,500	0	0

[a] gpm = gallons per minute
[b] AFY = acre-feet per year

8.14.5.1.1 Process and Cooling Water — Recycled Water Supply. Water for the SFERP for process and cooling water, equipment wash water, and the dual plumbing system (toilets) would be recycled water to be produced onsite at a new water treatment system included as part of the project design. Details of the SFERP water requirements, plant water cycle and process makeup water treatment are discussed in Section 2.0, Project Description.

The City will provide untreated process water (free of floatable matter and large debris) from a water pumping station to be constructed on Marin Street near Cesar Chavez, about one mile from the site. A new pipeline will be installed along Marin, Mississippi, Cesar Chavez, Tennessee, and 23rd streets to convey the process water to a new recycled water treatment

system located on the southern portion of the project site, adjacent to 23rd Street (see Figure 2-1).

The onsite treatment system will be designed to produce Title 22-quality recycled water, with the onsite treatment system providing primary, secondary, and tertiary treatment plus disinfection either by ultraviolet system or chlorination. The primary treatment will be accomplished by a traveling band screen, and the secondary treatment will be achieved in an aerobic tank to ensure proper biological activity. After the appropriate hydraulic retention time, the water will flow into the tertiary treatment system. The tertiary treatment and filtering will be achieved by incorporation of a Membrane BioReactor. The recycled water will then be disinfected and pumped to the recycled water storage tank for use within the plant for all non-potable water applications. This disinfected, tertiary treated water will meet the Title 22 criteria for recycled water.

The Title 22 recycled water will then be divided into supply for the cooling towers and supply for NO_x suppression injection and compressor evaporative cooling. Cooling water treatment may require the addition of chemicals such as a pH control agent (acid or caustic), a mineral scale dispersant (i.e., polyacrylate polymer), a corrosion inhibitor (phosphate based), and a biocide (hypochlorite or equivalent). The water to be used for NO_x suppression injection and compressor evaporative cooling will be further treated, beginning with a reverse osmosis system followed by an electrodeionization system.

8.14.5.1.2 Alternative Cooling Water Sources. The SWRCB Policy 75-58 specifies that to protect water quality and quantity, water rights applications for cooling water for power plants can only be approved if other sources of water are not feasible. This resolution applies to the use of inland surface waters for cooling purposes. Since the project proposes to use recycled water and is not applying for new water rights, Policy 75-58 is not applicable to this project. However, the SFERP use of recycled water is in conformance with the intent of the resolution. For purposes of completeness of the analysis, the following is a discussion of the alternative sources of cooling water listed in Policy 75-58 (in order of preference) to demonstrate the infeasibility of other sources.

1. **Wastewater being discharged to the ocean**—The SFERP proposes to use recycled water that would divert raw wastewater that would otherwise be treated at the Southeast Water Pollution Control Plant and then discharged to San Francisco Bay, an estuarine water body. While an alternative source of recycled water could be the Oceanside Water Pollution Control Plant, which discharges treated wastewater to the ocean, use of this source would require over 7 miles of pipeline to the SFERP site. Therefore, this is not a practical alternative due to the availability of a closer wastewater source.

2. **Ocean**—The SFERP site is adjacent to San Francisco Bay and about 7 miles from the Pacific Ocean; therefore use of ocean water is not practical due to the availability of a closer water source of equivalent quality to ocean water. Use of Bay water is discussed below.

3. **Brackish water from natural sources or irrigation return flow**—There are no sources of agricultural irrigation return flow in the vicinity of the project site. Bay water is a potential brackish water source that could be used for cooling water, but its use would result in potential impacts to the aquatic habitat due to thermal effects of discharges to the Bay and

construction of shoreline infrastructure. Use of Bay water would require an individual NPDES permit as well as permit approval from the Bay Conservation and Development Commission. Although technically feasible, this alternative was eliminated from consideration due to the availability of recycled water, which would have fewer potential impacts and fewer permitting requirements.

4. **Inland wastewater of low total dissolved solids (TDS)**—Regionally available sources of inland wastewater discharge to the San Francisco Bay; therefore, this alternative source is equivalent to the alternative source 3 above, use of Bay water.

5. **Other inland waters**—No other inland water sources, including groundwater, are available in sufficient quantity on a reliable basis.

8.14.5.1.3 Potable Water Supply. The project proposes to use potable water from the SFPUC's Hetch Hetchy Water Supply system for all potable plant service water, and fire protection needs and emergency backup cooling and process water supplies. The City's Auxiliary Water Supply System is also available for fire protection needs only. Projected demand for potable water uses at the SFERP is approximately 1,440 gallons per day, which is a negligible percentage of the current water demand in San Francisco of about 90 million gallons per day. Current and projected water supply from the Hetch Hetchy Water Supply System is adequate to meet this *de minimus* demand increase. Current and projected water supply meets all federal and state drinking water standards.

8.14.5.2 Wastewater Discharges and Disposal

This subsection characterizes the volume and quality of wastewater that would be generated by the SFERP and method of disposal. Estimated average and maximum daily and annual water discharge rates are provided in Table 8.14-7.

TABLE 8.14-7
Operational Wastewater Discharges from SFERP

Waste Discharge Stream	Discharge Location	Daily Discharge (gpm[a])		Annual Discharge (MGY[b])	
		Average	Maximum	Average	Maximum
Plant wastewater sump (discharge from process and cooling water, backwash water from ultra filters, and reject from reverse osmosis unit)	City combined sewer system	164	179	29.5	32.1
Wash water and plant drainage (e.g., equipment wash water, oil/water separator system, transfer pump water)	City combined sewer system	1	2	0.18	0.36
Sanitary sewage	City combined sewer system	1	2	0.18	0.36
Stormwater (based on 4.5-acre site, 100 percent impervious surface)	City combined sewer system	5	N/A	0.007	N/A

[a] gpm = gallons per minute
[b] MGY = million gallons per year based on 3,000 hours of maximum annual output.

8.14.5.2.1 Industrial Wastewater Discharges. As discussed in Section 2.0, cooling tower blowdown will be discharged to the plant wastewater sump, as required to maintain the level of dissolved solids of the cooling water within acceptable ranges. Backwash water from ultra filters, reject water from the reverse osmosis unit and wash water and plant drainage will also be discharged to the wastewater sump. This wastewater, in addition to wash water from the primary treatment process unit of the recycled water treatment plant and sanitary sewage, would then be discharged to the combined sewer system as permitted under the discharge permit to be obtained from the City under Article 4.1 of the San Francisco Public Works Code. Table 8.14-8 summarizes estimated water quality of wastewater discharges from the wastewater sump to the combined sewer system, based on approximately 5 cycles of concentration of the cooling tower blowdown. Constituents of concern were selected based on the City's Class I permit requirements, the City's NPDES requirements for the SEWPCP, the approved 303(d) list, and Title 22 requirements.

TABLE 8.14-8
Estimated Wastewater Water Quality

Constituent	Reason for Inclusion of Parameter	Wastewater (mg/L except as noted)
4,4 DDE	NPDES, 303(d)	0.006 µg/L
Arsenic	NPDES, Class I permit	4.0 µg/L
Barium	NPDES	—
Biological Oxygen Demand	NPDES	<5
Cadmium	NPDES & Title 22, Class I permit	0.6 µg/L
Chromium	NPDES, Class I permit	2.6 µg/L
Copper	NPDES, Class I permit	29.2 µg/L
Cyanide	Class I Permit	N/A
Dieldrin	303(d)	0.004 µg/L
Dissolved sulfides	Class I permit	N/A
Hydrocarbon oil and grease	Class I Permit	<10
Lead	NPDES, Class I permit	5.0 µg/L
Mercury	NPDES, Title 22, 303(d), Class I permit	0.04 µg/L
Nickel	NPDES, Class I permit	7.8 µg/L
Phenols	Class I permit	N/A
pH, pH units	NPDES & Class I Permit	6.0 - 9.0
Polynuclear aromatic hydrocarbons (PAHs)	NPDES, 303(d)	0.32 µg/L
Polychlorinated biphenyls	Title 22, 303(d)	0.20 µg/L
Selenium	NPDES, Title 22, 303(d)	0.10 µg/L

TABLE 8.14-8
Estimated Wastewater Water Quality

Constituent	Reason for Inclusion of Parameter	Wastewater (mg/L except as noted)
Silver	NPDES, Class I permit	2.0 µg/L
Total recoverable oil and grease	NPDES, Class I permit	<10
Total Suspended Solids	NPDES	<10
Zinc	NPDES, Class I permit	124 µg/L
Temperature (degrees Fahrenheit)	Class I Permit	70 ° F

8.14.5.2.2 Sanitary Sewage Disposal. Sanitary wastewater generated at SFERP, estimated at 1 gpm average and 2 gpm maximum, will also be discharged to the combined sewer system. This volume would be considered a *de minimus* increase in demand on the combined sewer system, not measurable within the overall dry weather flow (average 68 mgd) and well within the treatment, conveyance and disposal capacities of the City's system.

8.14.5.2.3 Stormwater Runoff and Drainage. The existing site is currently covered by 100 percent impervious surfaces and drains to the City's combined sewer system. The proposed SFERP would continue to have 100 percent impervious surfaces and drainage would be the same after project implementation. Assuming an annual average rainfall of about 21 inches and a 4.5-acre site, the annual average estimated stormwater contribution to the City's combined sewer system is approximately 2.5 million gallons per year (MG/yr) using the Rational Method and a runoff coefficient of 0.95. This volume of stormwater is considered negligible. The overall average yearly stormwater runoff is about 7,000 MG/yr on the east side of the City, where average annual dry weather flows are about 24,800 MG/yr. The SFERP would not result in a change in stormwater contribution from the site to the combined sewer system as compared with the existing conditions.

8.14.5.2.4 Construction Wastewater. As discussed in the Hazardous Waste section, construction wastewater could include stormwater runoff, groundwater from dewatering, equipment washdown water, water from pressure testing the gas lines, and water from the basement of Station A. During construction, stormwater runoff would be discharged to the City's combined sewer system in compliance with a required erosion and sediment control plan. Any groundwater produced from dewatering would require a permit from the City for discharge to the combined sewer system. Other wastewaters, such as equipment washdown, water from pressure testing and water from the basement of Station A, would be sampled; if the wastewater is determined to be non-hazardous, the contractor would obtain a permit from the City for discharge to the combined sewer system, and if the wastewater is determined to be hazardous, it would be handled in accordance with hazardous waste regulations and disposed of offsite (see Subsection 8.13, Waste Managements).

8.14.5.3 Water Balance

The average and maximum volume of water used in the SFERP plant processes are shown in Figure 8.14.2, together with projected volumes of outflow of water either discharged to the City's combined sewer system or lost by evaporation.

8.14.6 Environmental Consequences— Project Effects on Water Resources

Project effects on water resources can be evaluated relative to significance criteria derived from the CEQA Appendix G checklist. Under CEQA, the project is considered to have a potentially significant effect on water resources if it would:

- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which will result in substantial erosion or siltation on- or offsite, or in flooding on- or offsite.
- Create or contribute runoff water which will exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff.
- Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there will be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells will drop to a level which will not support existing land uses or planned uses for which permits have been granted).
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that will impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Cause inundation by seiche, tsunami, or mudflow.

8.14.6.1 Effects on Drainage and Surface Waters

Implementation of the project will not alter existing drainage patterns. The project site is currently covered by 100 percent impervious surfaces and drains to the City's combined sewer system. Drainage will continue unchanged under the proposed SFERP. The SFERP drainage facilities would include two stormwater catch basins on the south side of the site that would be connected to an existing sewer line in 23rd Street. Ultimate drainage of stormwater will continue to be discharged to the combined sewer system, and be subsequently discharged to San Francisco Bay through an existing outfall or overflow structure pursuant to the City's NPDES permit. There will be no change in volume of stormwater originating from the project site.

During construction, the Applicant will be required to develop and submit for review to the City, Bureau of Environmental Regulation and Management, an erosion and sediment control

plan to prevent the off-site migration of sediment and other pollutants and to reduce the effects of runoff from the construction site to the combined sewer system. The City will conduct periodic inspections to ensure compliance with the erosion and sediment control plan. During operation of the SFERP, discharges to the combined sewer system, including stormwater runoff, will be subject to the permit requirements of the City's Class I permit for industrial waste discharge. The permit requirements will include compliance with the federal combined sewer overflow control policy minimum controls, including development and implementation of a pollution prevention program. The City's pollution prevention program would require best management practices to minimize the amount of pollutants carried by stormwater to the combined sewer system.

Therefore, the project will not result in any change in surface water, erosion or siltation on- or offsite or in flooding on- or offsite, and the project would not exceed the capacity of existing drainage systems.

8.14.6.2 Effects on Groundwater

Groundwater at the project site is currently not used for potable water, and the project will have no effect on groundwater. The minor excavation and foundation structures required for SFERP would not result in any substantial change from the existing groundwater flow and conditions at the site. During construction, temporary dewatering may be required, and any dewatering activity would require a permit from the City for discharge to the combined sewer system. However, the project will have no long-term effect on groundwater.

8.14.6.3 Effects on Recycled Water and Potable Water

The project will use recycled water produced onsite for cooling tower makeup, other process water, equipment wash water, and dual plumbing. Recycled water use will have a net positive impact on water resources by reducing the amount of water discharged to San Francisco Bay and is consistent with the CEC objective for reusing water to the greatest extent practicable.

In addition, installation of dual plumbing would enable use of recycled water for toilets and other non-potable uses and would reduce the demand on the potable water supply.

8.14.6.4 Effects on Water Quality

The project would not result in a measurable effect on water quality during construction or operation. During both phases, all wastewater and stormwater discharges would flow to the City's combined sewer system in compliance with the Article 4.1 of the San Francisco Public Works Code. Flows to the combined sewer system would then be treated and discharged to the Bay in compliance with all applicable regulatory permits, providing an approved level of water quality protection.

During operation, the wastewater streams would consist of three main sources: industrial process water, stormwater discharges, and sanitary sewage. Quality and quantity of industrial wastewater discharges to the City's combined sewer system must be in compliance with a permit from the City under Article 4.1 of the San Francisco Public Works Code. The discharge would be required to meet the discharge limitations specified in Table 8.14-2 and other numeric and narrative standards discussed in Subsection 8.14.3.3.1. As shown in Table 8.14-8, the

anticipated quality of wastewater discharges from SFERP would be well within the City's discharge limitations. Discharge of stormwater from the site would continue to flow to the combined sewer system, and there would be essentially no change from existing conditions in terms of quantity and quality of stormwater discharges. The volume of sanitary sewage would be about 1,440 gallons per day, which is minimal compared to the overall volume of discharges to the City's sewer system.

The source of process and cooling water would be recycled water produced onsite and originating from water that would otherwise be transported to the SEWPCP; therefore, there would be a small net decrease in volume of overall discharges to the Bay. The project in effect would divert wastewater that would otherwise be discharged to the Bay, and that wastewater would be treated to meet Title 22 standards for recycled water and any additional processes needed to meet water quality requirements for the SFERP process and cooling water. Under average water usage conditions, about 48 percent of the recycled water would be returned to the combined sewer system and nearly 52 percent of the recycled water would be lost to evaporation. The net result would be a reduction in flow to the combined sewer system and a slight reduction in the volume of outflow discharges to the Bay, even though mass loading of pollutants would be the same. This would be an incidental, albeit minor, beneficial impact to water quality.

During construction, compliance with the City's requirements for an erosion and sediment control plan would prevent offsite migration of sediments and other pollutants in stormwater; in addition, the City would conduct periodic inspection to ensure compliance. Any stormwater drainage during construction would flow to the City's combined sewer system, where it would receive treatment at the SEWPCP or other wet weather facilities and would be discharged through an existing outfall or overflow structure in compliance with the existing NPDES permit. Therefore, the SFERP would not result in impacts to water quality.

8.14.6.5 Effects on Flooding Potential

The project is not located within an identified floodplain and there will be no change in the existing drainage pattern. The site is located at an elevation of approximately 26 feet above mean sea level, and more than 1,000 feet from the shoreline, and about 17 feet higher than the highest predicted 100-year tide elevation, including the effect of wind-generated wave runup at MHHW. Therefore, the project will have no potential to affect or be affected by flooding.

Although seiches and tsunamis can occur and cause tidal surges in San Francisco Bay, the Bay greatly attenuates tsunamis that might reach the Golden Gate area and these events are extremely rare. Potential inundation from seiche, tsunami, or mudflow is considered remote.

8.14.7 Mitigation Measures

Implementation of the SFERP project as designed will have less-than-significant impacts. The following project elements will effectively reduce potential impacts to water resources:

- Use of recycled water for cooling-tower makeup, other process water, and equipment washwater would divert wastewater from the combined sewer system.

- Compliance with requirements of Article 4.1 of the San Francisco Public Works Code regarding quality and quantity of discharges to the combined sewer system would avoid potential water quality effect on the Bay.
- Compliance with the Reclaimed Water Ordinance requiring installation of dual plumbing would reduce demand on the potable water supply.
- Compliance with the City's requirements for an erosion and sediment control plan would reduce potential impacts of stormwater runoff from the construction site.

8.14.8 Proposed Monitoring Plans and Compliance Verification Procedures

Routine monitoring and reporting of wastewater discharges and compliance verification will be required as part of the City's permitting requirements under Article 4.1 of the San Francisco Public Works Code. The Applicant will also be required to prepare an erosion and sediment control plan for review and approval by the City and will be subject to periodic inspection by the City during construction to ensure no adverse impacts to water quality. No additional monitoring of surface or groundwater will be required because no water quality impacts are expected to occur.

8.14.9 Cumulative Impacts

Cumulative impacts to water resources could occur through the contribution of additional industrial wastewater or stormwater runoff to the combined sewer system. However, as discussed previously, none of these categories of water use is expected to result in impacts to water resources, and therefore, the project would not contribute to cumulative impacts, as summarized below:

- **Surface Water:** The project would not involve construction in or disturbance of any surface waters or wetlands. All drainage from the site is, and would continue to be, directed to the combined sewer system.
- **Recycled Water**: The use of recycled water will have a net positive benefit for water supplies in the region, by reducing the net outflow of treated wastewater to the Bay.
- **Plant Sewage:** The proposed plant staff will generate insignificant volumes of sanitary sewage, not measurable within the total dry weather wastewater flows, and in addition, installation of dual plumbing so that recycled water would be used for toilet flushing would further reduce the net increase in sanitary sewage.
- **Groundwater**: The project would have no impact on groundwater, with the possible exception of encountering shallow groundwater during construction.
- **Stormwater**: The project would not change the volume or rate of stormwater generated from the site nor would it change the drainage. The site would continue to be covered by 100 percent impervious surfaces and drain to the City's combined sewer system.

8.14.10 Permits Required and Agencies Consulted

A summary of required permits and agency contacts is provided in Table 8.14-9.

TABLE 8.14-9
Water Quality Permits Required for SFERP

Permit	Schedule	Agency
San Francisco Class I Industrial Discharge Permit, Construction dewatering permit	Minimum of 90 days prior to the commencement of the discharge	San Francisco Public Utilities Commission Bureau of Environmental Regulation and Management 3801 Third Street, Suite 600 San Francisco, CA 94124 Contact: Tommy Lee, Division Engineer, Environmental Regulation and Management (415) 695-1321

8.14.11 References

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State Water Resources Control Board (SWRCB). 1997. Water Quality Order No. 97-03-DWQ. National Pollutant Discharge Elimination System (NPDES), General Permit No. CAS000001 (General Permit), Waste Discharge Requirements (WDRs) For Discharges of Stormwater Associated With Industrial Activities, Excluding Construction Activities. Available At http://www.swrcb.ca.gov/stormwtr.

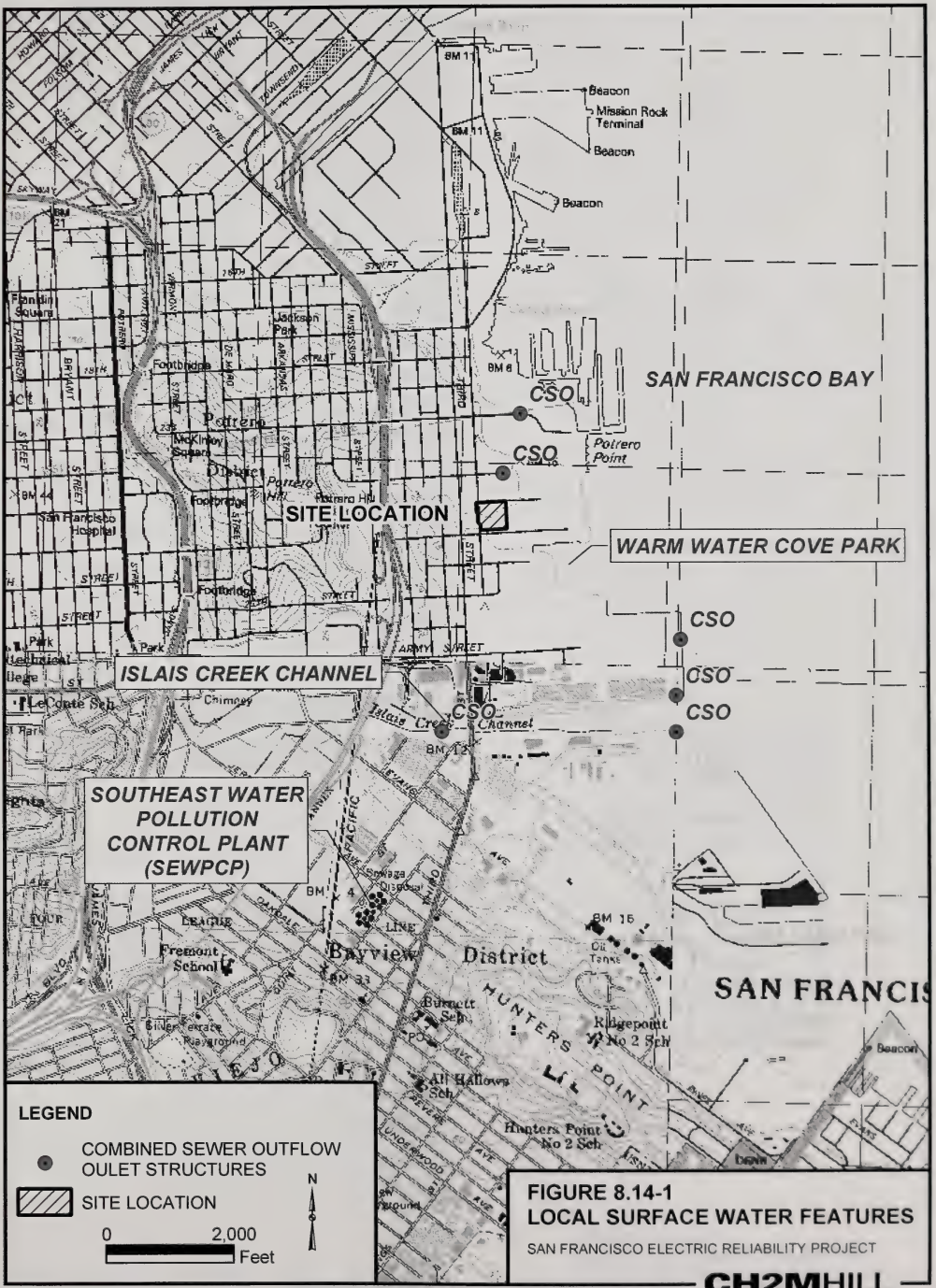
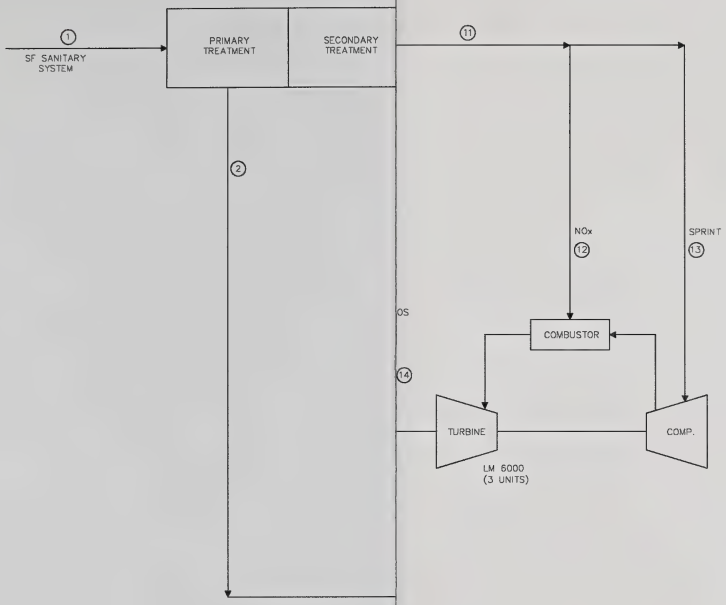


FIGURE 8.14-1
LOCAL SURFACE WATER FEATURES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL



SYMBOL	DATE	REVISION DESCRIPTION	DRAWN	APP'D
E	2-19-04	WATER BALANCE CHART ADJUSTED		
D	2-16-04	REVISED FOR 3 CTG'S		
C	1-27-04	REVISED PRELIMINARY ISSUE		
B	1-5-04	PRELIMINARY ISSUE FOR REVIEW		
A	11-18-03	PRELIMINARY ISSUE FOR REVIEW		

PB Power, Inc.
A Parsons Brinckerhoff Company
303 SECOND STREET, SUITE 700 NORTH, SAN FRANCISCO, CALIFORNIA 94107

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
WATER BALANCE DIAGRAM

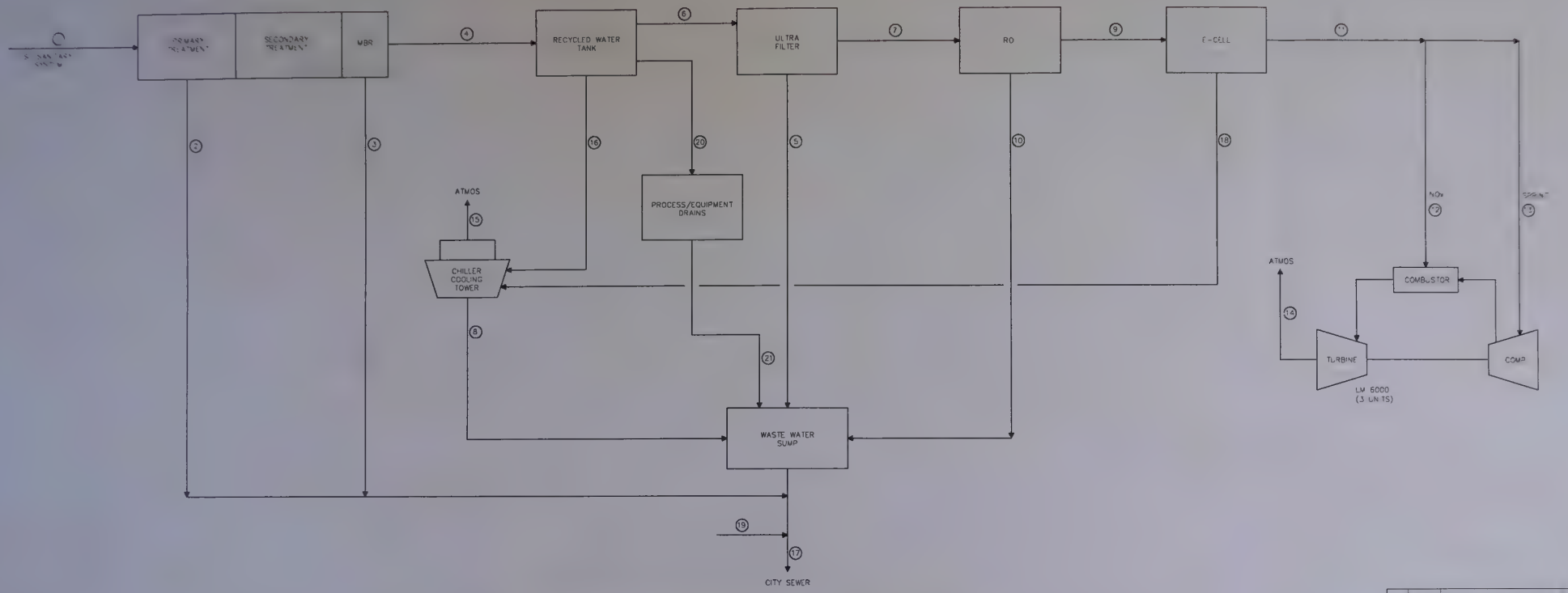
DR	LTW	DRAWING NO.	REV.
DES	CM	M2.2	E
CHK	CM	SHEET OF	

APPROVED DATE
PRINCIPAL IN CHARGE DATE

FIGURE 8.14-2
WATER BALANCE DIAGRAM
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_08 (3/2/04)

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SFPUC Electric Reliability Project - Water Balance — Rev E

Point No	From	To	Average Water Use (3 CTG's in Operation) GPM	Maximum Water Use (3 CTG's in Operation) GPM	Notes
1	SF sanitary system	Primary/Secondary Treatment	349	405	
2	Primary Treatment	Plant wastewater system	100	100	
3	MBR	Plant wastewater system	10	12	
4	MBR	Recycled water tank	239	296	
5	Ultra Filter Reject	Plant Waste Water Sump	15	14	
6	Reclaimed water tank	Ultra Filter Inlet	222	221	
7	Ultra Filter Product	RO Inlet	207	206	
8	Cooling Tower Blowdown	Plant Waste Water Sump	5	16	(@ 5 cycles of conc)
9	RO Product	E-Cell Inlet	175	174	
10	RO Reject	Plant Waste Water Sump	33	32	
11	E-Cell Product (DI Water)	CTG NOx & SPRINT Injection	166	165	
12	E-Cell Product (DI Water)	CTG NOx Injection	141	140	@ 25 ppm NOx
13	E-Cell Product (DI Water)	CTG SPRINT Injection	25	25	
14	DI Water Evaporation	Atmosphere	166	165	
15	Cooling Tower Evaporation	Atmosphere	19	54	
16	Recycled Water Tank	Cooling Tower Makeup	15	71	
17	Plant wastewater system	City Sanitary Sewer	166	183	
18	E-Cell Reject	Cooling Tower Makeup	9	9	
19	Domestic	Plant wastewater system	2	4	
20	Recycled water tank	Plant / equipment drains	2	4	
21	Plant / equipment drains	Plant Waste Water Sump	2	4	

Annual reclaimed water usage: 43,013,015 gallons
(based on 12,000 turbine-hours) 132 acre-feet

SYMBOL	DATE	REVISION DESCRIPTION	DRAWN	APPD
E	2-19-04	WATER BALANCE CHART ADJUSTED		
D	2-16-04	REVISED FOR 3 CTG'S		
C	11-27-04	REVISED PRELIMINARY SSLE		
B	1-5-04	PRELIMINARY SSLE FOR REVIEW		
A	11-18-03	PRELIMINARY SSLE FOR REVIEW		

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SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
WATER BALANCE DIAGRAM

DR LTW
DES CM
CHK CM
APPROVED DATE
PRINCIPAL IN CHARGE DATE

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FIGURE 8.14-2
WATER BALANCE DIAGRAM
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SUBSECTION 8.15

Geologic Hazards and Resources

8.15 Geologic Hazards and Resources

8.15.1 Introduction

This section evaluates the effect of geologic hazards and resources that might be encountered on the project site. The objective of this evaluation is to identify site conditions and the potential impacts from the construction or operation of the project. This section presents a summary of the relevant laws, ordinances, regulations, and standards (LORS); the existing site conditions; and the expected direct, indirect, and cumulative impacts because of construction, operation, and maintenance of the project. Proposed mitigation measures and the effectiveness and monitoring plans are also described. Permits that are required and permitting agencies are identified.

8.15.2 Laws, Ordinances, Regulations, and Standards

The LORS that apply to geologic hazards and resources are summarized in Table 8.15-1.

TABLE 8.15-1
Laws, Ordinances, Regulations, and Standards

Jurisdiction	Authority	Administering Agency	Compliance
Local	Uniform Building Code (UBC), 1997, Appendix Chapter 16, Division 4	City and County of San Francisco	Acceptable design criteria for structures with respect to seismic design and load-bearing capacity
State	California Building Code (CBC), 2001	City and County of San Francisco	

8.15.3 Affected Environment

The proposed San Francisco Electric Reliability Project (SFERP) site is a 4.5-acre parcel near Potrero Point in the Potrero District of the City of San Francisco (City). The project site is located along the eastern side of the San Francisco Peninsula, near the San Francisco Bay (the Bay) and north of Warm Water Cove. The San Francisco Peninsula lies within the northern Coast Ranges physiographic province. This province is characterized by a northwest-trending series of elongated ranges and narrow valleys and extends from the Oregon border to the Transverse Ranges in Southern California (Norris and Webb, 1990).

The proposed SFERP site is relatively flat (approximately 6 feet above mean sea level) and is underlain by Franciscan-age bedrock and older alluvial deposits, and locally by artificial fill. The southeastern half of the site is reclaimed tidal flats (Bay Muds and estuary deposits). A process water supply linear that is approximately one mile long will also be installed, originating from Marin Street and I-280 southwest of the site. The area is considered to be generally seismically unstable and is designated as a California UBC Seismic Zone 4.

8.15.3.1 Regional Geology

The geology of the SFERP vicinity is complex, largely a result of the interaction of the strike-slip tectonics of the San Andreas fault system and the compressional tectonics of the

Coast Ranges. The Coast Ranges are composed of a series of parallel, northwesterly trending folded and faulted ranges and represent structural blocks comprised of a variety of lithologic types. These structural blocks are juxtaposed by major geologic structures. The San Andreas fault zone lies to the west (approximately 8 miles) and is a major boundary that separates the Franciscan Complex rocks of the North American Plate from the Salinian basement rocks of the Pacific Plate.

8.15.3.2 Local Geology

The site is situated on the eastern edge of the Potrero Hill rock mass that is composed of serpentine bedrock of the Franciscan Formation. Quaternary to Holocene alluvial and estuarine deposits along with recent artificial fill overly the bedrock deposits. Approximately one-half of the site (the southeastern half) has been reclaimed through the placement of artificial fill since the mid-1800s. The geology within a 2-mile radius of the site is presented on Figure 8.15-1 (figures are located at the end of this subsection).

8.15.3.3 Stratigraphy

8.15.3.3.1 Franciscan Basement. The SFERP site is located within the Hunters Point Shear Zone within the Franciscan Complex and is primarily comprised of serpentinite. Large zones of serpentinite and brecciated materials from previous periods of deformation are characteristic of the Franciscan formation.

8.15.3.3.2 Quaternary Alluvial and Fluvial Deposits. Alluvial deposits that overly the Franciscan bedrock at the site were derived from topographic highs around the site. Lithologic types present include gravelly and clayey sands, and sandy clays. Bay Mud, associated with estuarine deposits, also overlies the bedrock. Artificial fill consists of a mixture of sand, gravel, and silt, with rubble and debris (e.g. bricks, concrete, wood, and re-worked bedrock). The entire site has been graded and covered with a layer of artificial fill and most of the site is covered with concrete, asphalt, or buildings (CDM, 1997).

8.15.3.3.3 Structure. The site is located within the Hunters Point Shear Zone on the northern edge of the San Francisco Peninsula. This shear zone is an older structure (Jurassic) that trends northwest across the Peninsula and has been deformed by translations and movement along the San Andreas Fault system (Dames and Moore, 2000).

The California Geological Survey (CGS) does not consider the shear zone active. A geophysical study performed by the United States Geological Survey (USGS) suggested that the shear zone was inactive during the late Pleistocene and Holocene eras (Dames and Moore, 2000).

The San Andreas Fault system is the most notable geologic structure in the site area. The fault system includes primary, secondary, and thrust faults that trend northwest in the regional area and are capable of producing large magnitude earthquakes.

8.15.3.4 Seismicity

The project site lies within the San Andreas Fault system region that separates the North American and Pacific plate boundaries. This boundary has been the site of numerous large-scale earthquakes. The area is considered seismically active. However, the site is not located within a special study zone, as delineated by the Alquist-Priolo Special Studies Zone Act of

1972; and no known fault, active or inactive, reaches the surface within the project area (Jennings, 1994). The significant faults in the San Francisco Bay area are described below and are shown on Figure 8-15-2.

8.15.3.4.1 San Andreas Fault. The nearest major fault is the San Andreas fault, which is approximately 8 miles west of the site. This fault is the largest active fault in California and extends from the Gulf of California to Cape Mendocino in northern California. The San Francisco moment magnitude (Mw) 7.9 earthquake of 1906 was attributed to this fault. The fault was previously divided into 3 segments, however the recommendation of the Working Group on Northern California Earthquake Potential (WGNCEP, 1996) was to subdivide the fault into 4 segments (the section of the fault north of Point Arena is now referred to as the Offshore segment). The primary three segments are located in the San Francisco Bay Area (North Coast, Peninsular, and Southern Santa Cruz Mountains) and have recently been assigned individual maximum credible earthquakes (MCEs) of Mw 7.5, Mw 7.2 and Mw 7.0, respectively, by the Working Group on Northern California Earthquake Potential (WGNCEP, 2003). The same working group identified the MCE for all 4 segments combined, as is thought to be the cause of the 1906 earthquake, to be Mw 7.9. According to the WGNCEP (2003), there is a 21 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.2 San Gregorio Fault. West of the San Andreas fault is the San Gregorio fault. This fault is approximately 12 miles from the project site and is considered to be an active Holocene fault. It is approximately 80 miles long and runs from Big Sur to the Golden Gate Bridge. Most of the fault is offshore, but several areas are onshore. The MCE from this fault is Mw 7.3 (WGNCEP, 2003). According to the WGNCEP (2003), there is a 10 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.3 Hayward and Rodgers Creek Fault. The Hayward and Rodgers Creek Fault System lies approximately 10 miles east of the site, across San Francisco Bay. The fault system is considered to include the northern and southern Hayward Fault system as well as the Rodgers Creek fault, and extends from Healdsburg south to Fremont (WGNCEP, 2003). It is approximately 87 miles long and is considered by the WGNCEP to be the most likely source of the next major earthquake of the Bay Area (WGNCEP, 1996). The 1868 local magnitude 6.8 Mw earthquake was the last major earthquake on the Hayward fault. A MCE Mw of 6.9 has been assigned to the simultaneous rupture of the northern and southern segments of the Hayward fault (WGNCEP, 2003). A simultaneous rupture of the three segments that make up this fault system has been assigned a MCE of Mw 7.3. According to the WGNCEP (2003), the Hayward and Rodgers Creek fault system has a 27 percent probability of generating a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.4 Calaveras Fault. The Calaveras fault lies approximately 21 miles east of the site. It is approximately 76 miles long and contains three identified segments that extend from Hollister to Danville. MCEs assigned for the three segments range from Mw 5.8 and Mw 6.2 for the southern and central segments, respectively, to Mw 6.8 for the northern segment (WGNCEP, 2003). Combined, the fault is assigned an MCE of Mw 6.9. According to the WGNCEP (2003), there is an 11 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.5 Concord-Green Valley Fault Zone. The Concord-Green Valley fault is located approximately 24 miles to the northeast of the site. It is a 35-mile long right-lateral strike-slip fault that extends from Walnut Creek north across Suisun Bay to Wooden Valley WGNCEP (2003). The MCE previously assigned to the assumed 2 segments of this fault system was Mw 6.9 (WGNCEP, 1999). According to the WGNCEP (2003) the fault system actually comprises 3 individual segments with a combined MCE of Mw 6.7. According to the WGNCEP (2003), there is a 4 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.6 Greenville-Marsh Creek Fault. The Greenville-Marsh Creek fault is located approximately 28 miles east of the site. The fault is a northwest-striking strike-slip fault approximately 35 miles long in the northern Diablo Range. The MCE assigned for this two-segment fault is Mw 6.9 (WGNCEP, 2003). According to the WGNCEP (2003), there is a 3 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.5 Geologic Hazards

A site-specific geotechnical investigation has been conducted at the project site. Results will be provided upon CEC request.

The following subsections discuss the potential geologic hazards that might occur in the project area.

8.15.3.5.1 Ground Rupture. Ground rupture is caused when an earthquake event along a fault creates rupture at the surface. Since no known faults exist at the project site, the likelihood of ground rupture to occur at the project site is low.

8.15.3.5.2 Seismic Shaking. Analysis by the computer program EQFault (Blake, 2000), a deterministic estimation of peak acceleration from digitized faults based on the 1996 fault maps, indicates that peak horizontal geologic hazard at the SFERP site is strong ground-shaking due to an earthquake. Mualchin (1996) estimated that the ground-shaking of a Mw 8.0 earthquake along the San Andreas fault system could produce peak ground gravity (g) acceleration of up to 0.4 g in the vicinity of the SFERP. Ground acceleration (PHGA) at the site could be a high as 0.48 g. The USGS seismic hazard mapping web site (http://geohazards.cr.usgs.gov/eq/) indicates that the PHGA could be as high as 0.53 g based on the 1996 seismic hazard map using a latitude/longitude site-specific search (USGS, 2002). The San Francisco Bay Area has experienced strong ground motion in the past and will do so in the future.

8.15.3.5.3 Liquefaction. During strong ground-shaking, loose, saturated, cohesionless soils can experience a temporary loss of shear strength. This phenomenon is known as liquefaction. Liquefaction is dependent on grain size distribution, relative density of the soils, degree of saturation, and intensity and duration of the earthquake. The potential hazard associated with liquefaction is seismically induced settlement. The depth to groundwater at the project site is relatively shallow, approximately 15 feet, and the soil types generally consist of rubble and silts and sands as well as estuarine deposits (Geomatrix, 2000); in addition, a large portion of the site contains man-made fill of unknown origin. Therefore, the likelihood that liquefaction will occur is considered moderate to high. The 2001 Seismic Hazard Map for the City and County of San Francisco (CDMG, 2000) labels the southwestern portion of the site

as an "Area(s) where historic occurrence of liquefaction, or local geological, geotechnical, or groundwater conditions indicate a potential for permanent ground displacement such that mitigation as defined in Public Resources Code Section 2693 would be required."

8.15.3.5.4 Mass Wasting. Mass wasting depends on steepness of the slope, underlying geology, surface soil strength, and moisture in the soil. Significant excavating, grading, or fill work during construction might introduce mass wasting hazards at the SFERP site. Because the SFERP site is relatively flat and no significant excavation is planned during site construction, the potential for direct impact from mass wasting at the site is considered low to negligible.

8.15.3.5.5 Subsidence. Subsidence can be a natural or man-made phenomenon resulting from tectonic movement, consolidation, hydrocompaction, or rapid sedimentation. Given that the site is underlain by graded bedrock and dense fill, the potential for subsidence, as a hazard that could affect the project site, is low.

8.15.3.5.6 Expansive Soils. Expansive soils shrink and swell with wetting and drying. The shrink-swell capacity of expansive soils can result in differential movement beneath foundations. Site-specific borings advanced in the vicinity of the project site have identified graded bedrock and artificial fill (Geomatrix, 2000). In addition, the depth to water is relatively shallow and significant shrink-swelling would not be expected. Based on these, the likelihood of expansive soils to be present at the site is low.

8.15.3.5.7 Geologic Resources of Recreational, Commercial, or Scientific Value. Geologic resources of recreational, commercial, or scientific value in the project vicinity that could be affected include aggregate and gas reserves. Geologic resources of value are discussed in the next paragraph.

8.15.3.5.8 Aggregate Resources. In 1987, the California Division of Mines and Geology performed a mineral land classification of the San Francisco-Monterey Bay Area. According to the published report, the entire SFERP site was classified as Mineral-Resource Zone (MRZ)-1, defined as "areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence" (Dames and Moore, 2000). Two areas nearby were classified as MRZ-2, where "significant mineral deposits are present." These are in the Bernal Heights area and near Candlestick Point. However, neither of these two locations are under development.

8.15.3.5.9 Natural Gas. No oil or gas fields are present in the project vicinity, according to online maps from the State of California Division of Oil, Gas and Geothermal Resources (CDOGGR, 2003).

There are no known geologic resources that provide a significant scientific or recreational value in the vicinity of the site.

8.15.4 Environmental Impacts

8.15.4.1 Generating Facility

8.15.4.1.1 Geologic Hazards. Ground-shaking presents the most significant geologic hazard to the proposed SFERP site and project linear. Table 8.15-2 summarizes the geologic hazards associated with the SFERP.

TABLE 8.15-2
Summary of Potential Geologic Hazards

Project Component	Area of Potential Concern	Geologic Hazards of Potential Concern
Proposed generating facility site (up to 4.5 acres)	Entire site	Seismic ground-shaking, liquefaction
Process water linear	Entire site	Seismic ground-shaking, liquefaction

8.15.4.1.2 Geologic Conditions and Topography. Construction will require minor grading and excavation, thereby altering the terrain of the SFERP site. Impacts on the geologic conditions involve changes in drainage, cuts, and fills. Since the site is generally level, site grading is not expected to adversely impact the geologic environment.

8.15.4.2 Geologic Resources of Recreational, Commercial, and Scientific Value

No known natural resources occur in the SFERP site area. The two MRZ-2 areas identified near Bernal Heights and Candlestick Point are not being actively developed. No significant impact to geologic resources would occur with the project.

8.15.5 Mitigation Measures

The following subsections describe mitigation measures that could be used to reduce impacts from geologic hazards.

8.15.5.1 Ground Rupture

No active faults cross the SFERP site or project linear (Jennings, 1994). Therefore, no mitigation measures are required to reduce the hazard from surface faulting rupture.

8.15.5.2 Ground-Shaking

The SFERP site and project linear will need to be designed and constructed to withstand strong earthquake-shaking as specified in the 2001 CBC for Seismic Zone 4. A site-specific geotechnical investigation (forthcoming) will aid in the development of the seismic design criteria.

8.15.5.3 Liquefaction

The soil types present at the SFERP site and along the project linear may be conducive to liquefaction. A site-specific geotechnical investigation currently being conducted will aid in the assessment of liquefaction potential and lateral spreading.

8.15.5.4 Subsidence

Based on site-specific data, subsidence is not considered to be a hazard at the site and mitigation would not be required.

8.15.5.5 Expansive Soils

Expansive soils can be mitigated by removing the soil and backfilling with non-expansive soil, instituting chemical stabilization of the soil, or constructing a foundation treatment that

resists uplift of the expansive soil. Previous borings drilled at the site have not identified soils that would be prone to expansion. As a result, mitigation measures would not be required at the site.

8.15.6 Involved Agencies and Agency Contacts

No permits are required for compliance with geological LORS. However, the City and County of San Francisco Building Department is responsible for enforcing compliance with building standards.

8.15.7 Permits Required and Permit Schedule

Compliance of building construction with UBC standards is covered under engineering and construction permits for the project. There are no other permit requirements that specifically address geologic resources and hazards. However, excavation/grading and inspection permits will be required prior to construction and will be included in the overall project construction permit. Borings planned for the geotechnical investigation will require a permit from the Department of Public Health. Required permits and agency contact information are summarized in Table 8.15-3.

TABLE 8.15-3
Permits and Agency Contact Information

Agency	Contact	Telephone
City and County of San Francisco Department of Environmental Health—Monitoring Well Unit	Phil Snyder—Inspector	(415) 252-3847

8.15.8 References

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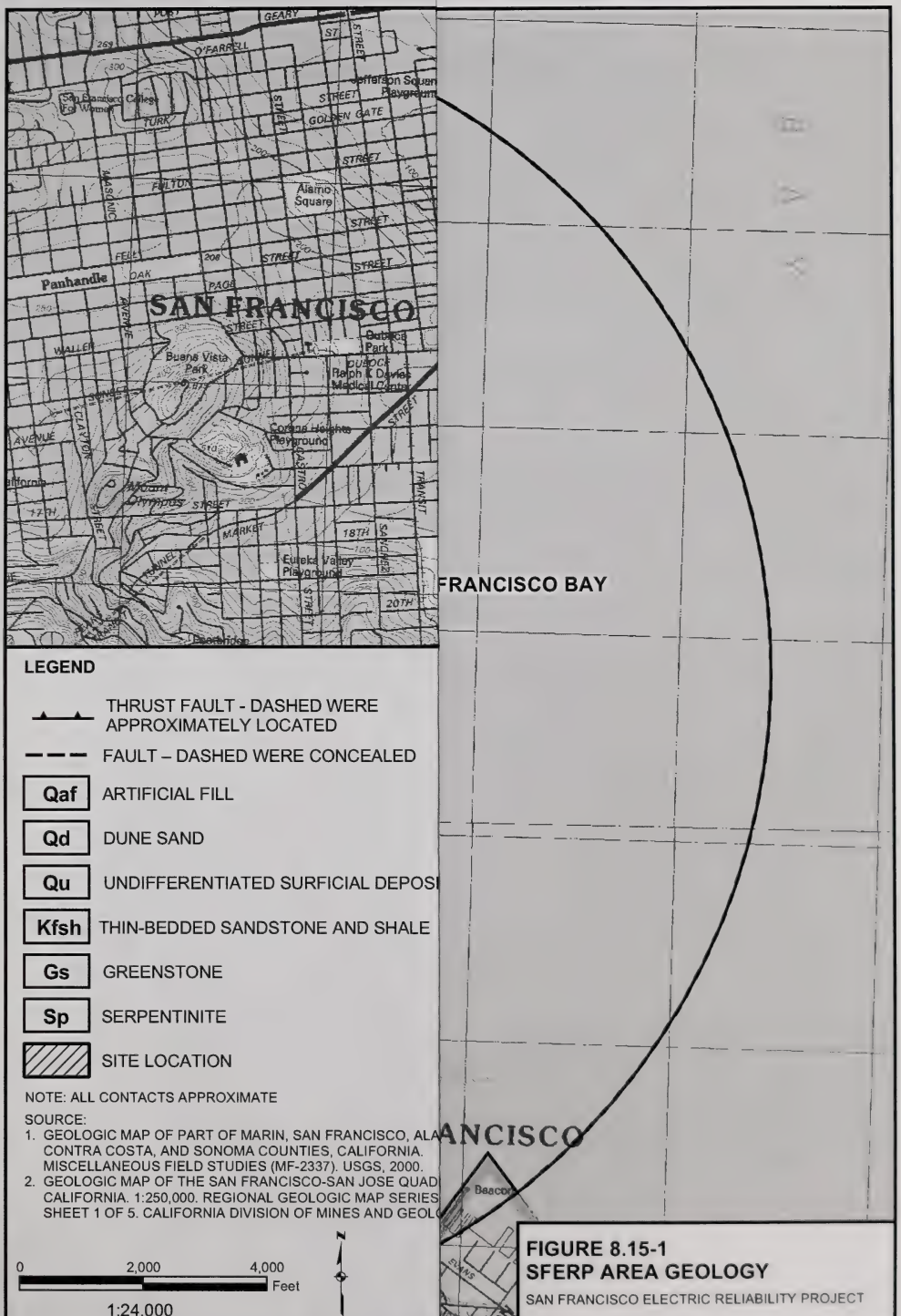


FIGURE 8.15-1
SFERP AREA GEOLOGY
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

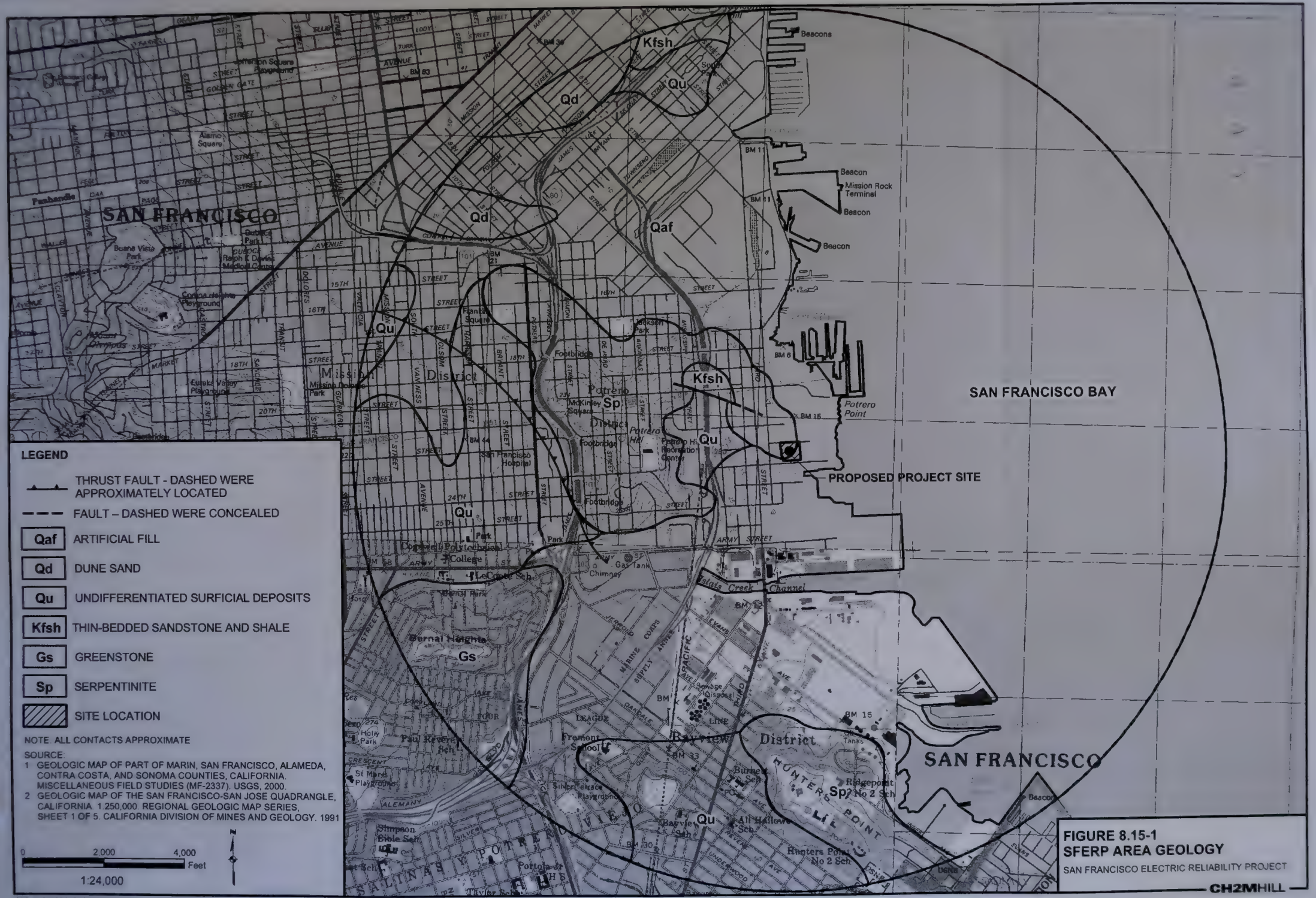
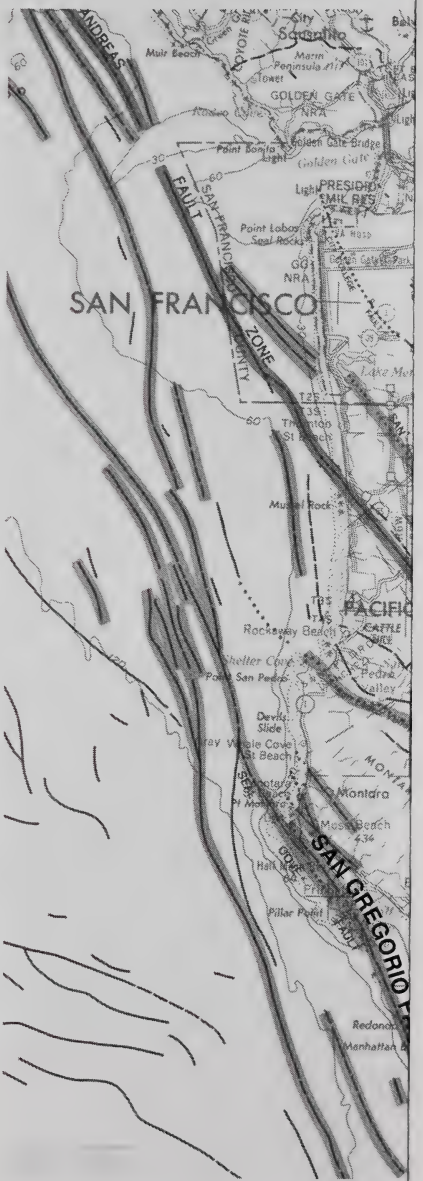


FIGURE 8.15-1
SFERP AREA GEOLOGY
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SCALE 1:250,000

SOURCE: MAP SHOWIN
GEOLOGIC MAP SERIE

FIGURE 8.15-2
SFERP IN RELATION TO PRINCIPAL FAULT ZONES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

D122003004RDD_01 (1/20/04)



SCALE 1:250,000

SOURCE: MAP SHOWING RECENCY OF FAULTING, SAN FRANCISCO-SAN JOSE QUADRANGLE, CALIFORNIA. REGIONAL GEOLOGIC MAP SERIES SHEET 5 OF 5. CA. DEPT. OF CONSERVATION DIV. OF MINES AND GEOLOGY 1991.

FIGURE 8.15-2
SFERP IN RELATION TO PRINCIPAL FAULT ZONES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
CH2MHILL

SUBSECTION 8.16

Paleontological Resources

8.16 Paleontological Resources

8.16.1 Introduction

Paleontological resources (fossils—the remains of prehistoric plants and animals) are important scientific and educational resources because of their use in (1) documenting the presence and evolutionary history of particular groups of now extinct organisms, (2) reconstructing the environments in which these organisms lived, and (3) in determining the relative ages of the strata in which they occur and the geologic events that resulted in the deposition of the sediments that formed these strata. This subsection summarizes the potential environmental impacts on paleontological resources that may result from construction of the San Francisco Electric Reliability Project (SFERP).

8.16.2 Laws, Ordinances, Regulations, and Standards

Paleontological resources are non-renewable scientific and educational resources and are protected by several federal and state statutes (California Office of Historic Preservation, 1983; see also Marshall, 1976, West, 1991, Fisk and Spencer, 1994, and Gastaldo, 1999), most notably by the 1906 Federal Antiquities Act and other subsequent federal legislation and policies and by the State of California's environmental regulations (California Environmental Quality Act [CEQA], Section 15064.5). Professional standards for the assessment and mitigation of adverse impacts on paleontological resources have been established by the Society of Vertebrate Paleontology (1995, 1996). Design and construction of the proposed SFERP will be conducted in accordance with all laws, ordinances, regulations, and standards (LORS) applicable to paleontological resources. Federal, State, County, and City LORS applicable to paleontological resources are summarized in Table 8.16-1 and discussed briefly below, along with Society of Vertebrate Paleontology (SVP) professional standards.

TABLE 8.16-1
LORS Applicable to Paleontological Resources

LORS	Applicability	Reference	Project Conformity
Antiquities Act of 1906	Protects paleontological resources on federal lands	Section 8.16.2.1	Yes
Public Resources Code, Sections 5097.5/5097.9	Protects paleontological resources on publicly owned lands in the State of California	Section 8.16.2.2	Yes
CEQA, Appendix G	Requires that impacts to paleontological resources be assessed and mitigated on all discretionary projects, public and private	Section 8.16.2.2	Yes

8.16.2.1 Federal LORS

Federal protection for significant paleontological resources would only apply to the SFERP if any construction or other related project impacts occur on federally owned or federally managed lands. Federal legislative protection for paleontological resources stems primarily

from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 et seq.; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal lands. Since the SFERP site is not on federally owned or managed land, federal LORS do not apply to this project.

8.16.2.2 State LORS

The California Energy Commission (CEC) environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of the California Environmental Quality Act (CEQA; Public Resources Code Sections 21000 et seq.). CEQA requires that public agencies and private interests identify the potential environmental consequences of their proposed projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code Section 5020.1 [b]). Guidelines for the Implementation of CEQA (Public Resources Code Sections 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA. Appendix G in Section 15023 provides an Environmental Checklist of questions that a lead agency should address if relevant to a project's environmental impacts. One of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section V, part c) is the following: "Would the project directly or indirectly destroy a unique paleontological resource or site...?"

Although CEQA does not define what is "a unique paleontological resource or site," Section 21083.2 defines "unique archaeological resources" as "...any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. [It] contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. It has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. [It] is directly associated with a scientifically recognized important prehistoric or historic event."

With only slight modification, this definition of "unique archaeological resources" is equally applicable to recognizing "a unique paleontological resource or site." Additional guidance is provided in CEQA Section 15064.5 (a)(3)(D), which indicates "generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history."

Section XVII, part a, of the CEQA Environmental Checklist asks a second question equally applicable to paleontological resources: "Does the project have the potential to eliminate important examples of the major periods of California history or pre-history?" Fossils are important examples of the major periods of California prehistory. To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is *yes* or *possibly*, a mitigation and monitoring plan must be designed and implemented to protect significant paleontological resources.

The CEQA lead agency having jurisdiction over a project is responsible to ensure that paleontological resources are protected in compliance with CEQA and other applicable statutes. The lead agency with the responsibility to ensure that fossils are protected during construction of the proposed SFERP is the CEC. California Public Resources Code Section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the CEQA lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

Other state requirements for paleontological resource management are in California Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792), entitled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources. This statute would apply to the proposed SFERP since construction or other related project impacts would occur on publicly owned or managed lands.

8.16.2.3 County and City LORS

California Planning and Zoning Law requires each county and city jurisdiction to adopt a comprehensive, long-term general plan for its development. The general plan is a policy document designed to give long range guidance to those making decisions affecting the future character of the planning area. It represents the official statement of the community's physical development as well as its environmental goals. The general plan also acts to clarify and articulate the relationship and intentions of local government to the rights and expectations of the general public, property owners, and prospective investors. Through its general plan, the local jurisdiction can inform these groups of its goals, policies, and development standards; thereby communicating what must be done to meet the objectives of the general plan.

The current general plan for City and County of San Francisco (CCSF) (2000) contains no specific requirements, regulations, ordinances, conditions, standards, goals, or objectives designed to mitigate the negative impacts of development on paleontological resources. However, the general plan does contain the following general statement in Policy 1.4: "Assure that all new development meets strict environmental quality standards…." In explaining this policy, the general plan states: "In reviewing all proposed development for probable environmental impact, careful attention should be paid to upholding high environmental quality standards." In addition, the Environmental Protection section of the Central Waterfront chapter of the general plan states in Objective 7: "Assure that the land resources in San Francisco are used in ways that both respect and preserve the natural values of the land and serve the best interests of all the City's citizens." San Francisco general plan Policy 7.1 states, "Features of a…geological…nature are also important criteria [in determining the value of land] as open space. These natural values of land should be respected." The Preservation Element of the San Francisco general plan presents a comprehensive set of policies for the preservation of San Francisco's cultural resources and defines cultural resources to "include…objects…which are historically or archaeologically significant, or significant in our…scientific…or cultural annals." This section of the General Plan establishes as a goal: "Protect Cultural Resources. Preserve significant cultural

resources." Under CEQA, paleontological resources are included as significant cultural resources.

8.16.2.4 Professional Standards

To assist in the compliance with applicable laws, the SVP, an international scientific organization of professional vertebrate paleontologists, has established standard guidelines (SVP, 1995; 1996) that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, identification, analysis, and museum curation. The SVP's standard guidelines were approved by a consensus of professional paleontologists and are a commonly used standard against which paleontological monitoring and mitigation programs are evaluated. Most professional paleontologists in the United States adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically spelled out in these standard guidelines. Many regulatory agencies, including the CEC, have either formally or informally adopted the SVP's standard guidelines for the mitigation of construction-related adverse impacts on paleontological resources, including federal (FERC, USFS, BLM, NPS, etc.), state (CEC, CPUC, Caltrans, etc.), and many county and city agencies. Briefly, SVP guidelines require that each project have literature and museum archival reviews, a field survey, and, if there is a high potential for disturbing significant fossils during project construction, a mitigation plan that includes monitoring by a qualified paleontologist to salvage fossils encountered, identification of salvaged fossils, determination of their significance, and placement of curated fossil specimens into a permanent public museum collection (such as the designated California State repository for fossils, the University of California Museum of Paleontology at Berkeley).

8.16.3 Setting

8.16.3.1 Geographic Location

The site proposed for construction of the SFERP is located on a parcel within the existing Potrero Power Plant (Potrero PP), in the City of San Francisco. San Francisco Bay (Bay), which forms the eastern boundary of the City, also forms the eastern boundary of the Potrero PP site. The Bay fills a north-northwest-trending structural depression in the central Coast Ranges and lies between the San Andreas Fault to the southwest and the Hayward Fault to the northeast. The center of the SFERP site is located at approximately 37°45'24" N. latitude and 122°23'00" W. longitude in T. 2 S., R. 5 W. This township has never been surveyed into sections because it was part of an original Spanish land grant. The SFERP site is adjoined on the south by 23rd Street, on the north by Humboldt Street, and on the west by the PG&E Portrero Substation located on Illinois Street.

To provide a source of cooling water for the SFERP, the San Francisco combined sewer system will be intercepted at a collection station near the east end of Marin Street where it dead ends at the Caltrain tracks. At this location a diversion/control structure and pump station will be built and effluent will be conveyed via an underground pipeline to a water treatment facility to be located on the southern boundary of the SFERP site, adjacent to 23rd Street. A portion of the approximately one-mile-long effluent pipeline will be buried within existing streets and a portion will be located within an existing underground collection box.

All the proposed SFERP facilities will be located within either the southernmost portion of the U. S. Geological Survey (USGS) San Francisco North or the northernmost portion of the San Francisco South 7.5′ (1:24,000-scale) standard topographic maps.

The City of San Francisco is located in the northern portion of the San Francisco Peninsula, which consists of north-northwest oriented ridges comprising the western portion of the Coast Ranges Physiographic Province (Fenneman, 1931; Jahns, 1954). The Coast Ranges Physiographic Province is located between the Great Valley Physiographic Province on the east and the Pacific Ocean on the west.

The general project area is located along the gently sloping western shore of the Bay. The site proposed for SFERP is located between the low rolling hills of the San Francisco Peninsula to the west and, on the east, by the Bay itself. Although the modern Bay shoreline is immediately adjacent to the Potrero PP site on the east, in 1857 tidal marshlands actually extended into the southwestern portion of the project site (Nichols and Wright, 1971; Helley and Miller, 1992). The area surrounding the SFERP site is completely urbanized (Stinson et al., 1986), with ever increasing industrial development. The general location of the proposed SFERP facilities is shown on Figure 2-1 and confidential Figure 8.16-1 (filed confidentially under separate cover).

The project area consists of a bedrock high surrounded by a gently sloping alluvial fan and flood plain with an average elevation of only about 26 feet above mean sea level. A few small but prominent rocky hills surround the SFERP site. The largest of these surrounding hills is to the southwest and named Bernal Heights; the hills near the project area to the west and south are named Potrero Hill and Hunters Point, respectively. Streams draining these hills (particularly Islais Creek and tributaries) have built an alluvial fan that forms the broad, gently sloping surface on which the proposed SFERP is to be built.

The low alluvial fans surrounding San Francisco Bay have frequently been referred to as part of the bay plain (see for instance Robinson, 1956). Welch (1981) used the bay plain to refer to all that area extending from the foothills of the adjacent highlands to the tidal flats of the Bay. However, the bay plain was first defined by Finlayson et al. (1967) as that area surrounding San Francisco Bay, having an elevation between lower low tide and higher high tide. In other words, the bay plain as defined by Finlayson et al. (1967) is intertidal and distinct from adjacent areas of higher relief that are not directly affected by tides. Rather than attempt to make an arbitrary distinction between the bay plain and alluvial fan based on a nearly imperceptible change in slope, the distinction can easily be made based on modern tidal influence alone. Helley et al. (1979) applied the name flatlands to areas surrounding San Francisco Bay with a slope less than 15 percent. However, rather than adopt the inappropriate name *flatland* for a gently sloping surface (Helley et al., 1979) or use the often misused term bay plain, the term alluvial fan is used for that area that lies between the Bay tidal flats (bay plain sensu stricto) and the bedrock adjacent hills.

8.16.3.2 Regional Geologic Setting

The general geology of the San Francisco area has been described in some detail by Lawson (1895, 1914), Crandall (1907), Louderback (1939, 1951), Taliaferro (1941, 1951), U. S. Army Corps of Engineers (USACE) (1963), Treasher (1963), Trask and Rolston (1951), Goldman (1967, 1969a), Finlayson et al. (1967), Finlayson et al. (1968), Schlocker (1968, 1974), Helley et

al. (1979), Wahrhaftig and Sloan (1989), and Wahrhaftig et al. (1993), among others. The information in these and other published reports form the basis of the following discussion. Individual publications are incorporated into this report and referenced where appropriate.

The geology in the vicinity of the proposed project facilities has been geologically mapped by numerous workers, including Wahrhaftig et al. (1993; 1:1,000,000 scale); Jennings (1977; 1:750,000 scale); Jenkins (1938; 1:500,000 scale); Schlocker (1971, 1:500,000 scale); Jennings and Burnett (1961, 1:250,000 scale), Finlayson et al. (1967; 1:125,000 scale); and Helley et al. (1979; 1:125,000 scale). Larger scale mapping of the project site is provided by Lawson (1914; 1:62,500 scale), Brabb and Pampeyan (1972; 1:62,500 scale), Lajoie et al. (1974; 1:62,500 scale), Lawson (1908; 1:40,000 scale), Schlocker et al. (1958; 1:24,000 scale), Schlocker (1961, 1974; 1:24,000 scale), Bonilla (1964, 1971; 1:24,000 scale), and Radbruch and Schlocker (1:12,000 scale). The site-specific geology of the SFERP site, water pipeline route, and immediate vicinity will be considered separately below.

The geology of the San Francisco Peninsula is poorly known, owing in large part to its structural and stratigraphic complexities and also to a lack of exposures. Large portions of the area are covered by water, surficial deposits, artificial fill, and man-made structures. In general, the geology of the San Francisco Peninsula consists of bedrock hills surrounding small, narrow valleys filled with unconsolidated deposits. The aspects of geology pertinent to this report are the types, distribution, and ages of rocks and sediments immediately underlying the project area and their probability of producing fossils during project construction.

Geological materials in the general vicinity of the SFERP site can be divided into two distinct units: bedrock composed of Jurassic, Cretaceous, and Tertiary age sandstone, siltstone, shale, chert, greenstone, and serpentinite named the Franciscan Complex (Franciscan Formation of some reports); and much younger, unconsolidated, sedimentary deposits that range in age from Pleistocene to Recent and which have been variously subdivided and named by geologists. Formal formation names have been applied to the Pleistocene to Recent sedimentary sequence by some authors (see for instance Lawson, 1914). However, most geologists working in the San Francisco Bay area still prefer to use informal designations, such as "older bay mud," "sand deposits," and "younger bay mud." The geographic extent and limiting geologic ages of these informal stratigraphic units are still uncertain.

The geologic history of the San Francisco area is still imperfectly known. Considerable difficulty in interpreting the geologic history is due to the fact that many of the deposits have limited local extent and their time relations cannot be determined by either tracing their lateral continuity or determining their relative superposition. In addition, not all units contain age-diagnostic fossils. The result is that, even after years of study by geologists and paleontologists, any statement of the geologic history of the San Francisco Bay region must still be looked upon as incomplete. Our understanding has not dramatically improved since Savage (1951) stated, "Many stratigraphic problems still exist in this area despite the fact that these problems have at times received the attention of competent geologists and paleontologists." New excavations have the potential to yield important new information, new fossils, or other field evidence, which may add to, confirm, or require modification of previous interpretations. This new information has the potential to also provide a more

complete and accurate understanding of both the geological and biological history of the area.

8.16.3.3 Resource Inventory Methods

To develop a baseline paleontological resource inventory of the SFERP site, water pipeline route, and surrounding area and to assess the potential paleontological productivity of each stratigraphic unit present, the published as well as available unpublished geologic and paleontologic literature was searched and stratigraphic and paleontologic inventories were compiled, synthesized, and evaluated (see below). These tasks are in compliance with CEC (2000) and Society of Vertebrate Paleontology (SVP, 1995) guidelines for assessing the importance of paleontological resources in areas of potential environmental impact. In addition, to obtain further information for this assessment, a field survey of the SFERP site and surrounding area was conducted on 25 February 2004 by Dr. Lanny H. Fisk, Ph.D., R.G. Dr. Fisk was also present during geotechnical drilling to determine what rocks and sediments underlie the SFERP site. These geotechnical borings helped determine the subsurface distribution of stratigraphic units and further evaluate their potential for producing scientifically important paleontological resources.

8.16.3.3.1 Stratigraphic Inventory. Geologic maps and reports covering the bedrock and surficial geology of the project site, water pipeline route, and vicinity were reviewed to determine the exposed and subsurface stratigraphic units, to assess the potential paleontological productivity of each stratigraphic unit, and to delineate their respective areal distribution in the project area. The SFERP site and vicinity is thoroughly urbanized with concrete, asphalt, or buildings covering nearly the entire surface area. The only rock outcrops are serpentinite exposed at the north-central edge of the SFERP property. No disturbed or undisturbed native sediments exist at the surface within or near the proposed location of the SFERP.

8.16.3.3.2 Paleontological Resource Inventory. Published and unpublished geological and paleontological literature (including previous environmental impact assessment documents and paleontological resource impact mitigation program final reports) were reviewed to document the number and locations of previously recorded fossil sites from rock units exposed in and near the project site and the types of fossil remains each rock unit has produced. The literature review was supplemented by an archival record search of the University of California Museum of Paleontology (UCMP) in Berkeley, California, looking for additional information regarding the occurrence of fossil sites and remains in and near the site proposed for project construction.

8.16.3.4 Resource Inventory Results

8.16.3.4.1 Stratigraphic Inventory. Large scale geologic mapping of the SFERP site and vicinity has been provided by Lawson (1914; 1:62,500 scale), Brabb and Pampeyan (1972; 1:62,500 scale), Lajoie et al. (1974; 1:62,500 scale), Lawson (1908; 1:40,000 scale), Schlocker et al. (1958; 1:24,000 scale), Schlocker (1961, 1974; 1:24,000 scale), Bonilla (1964, 1971; 1:24,000 scale), and Radbruch and Schlocker (1958, 1:12,000 scale). Unfortunately, in these geologic maps, geologists have not consistently used the formally named formations of Lawson (1914), nor have they consistently used the same map units. As a result of different geological map units being used, considerable interpretation is required to compare these

information sources and determine stratigraphic relations and relative ages of the individual map units.

Instead of using formally named and lithologically and chronologically distinct geologic formations, many geologists working in the San Francisco area have used map units that reflect depositional processes or facies. Although they are facies subdivisions of alluvial fan and intertidal bay deposits, these map units are shown on geologic maps with distinct contact lines when actually contacts between map units are gradational, with alluvial fans grading into alluvial plains, which grade imperceptibly into bay muds. These mapped boundaries may represent the best possible estimate of facies distribution; however, they have limited utility in determining stratigraphic superposition, relative age, or potential for producing significant paleontological resources. In addition, using facies subdivisions makes it more difficult to compare descriptions of fossil sites, which typically use formally named stratigraphic units rather than facies.

For these reasons, in this discussion the report uses the formally named stratigraphic units of Lawson (1914), which have been found to be generally applicable to the area (Trask and Rolston, 1951; Mitchell, 1963), despite the fact that many current engineering geologists and hydrogeologists still prefer to use informal stratigraphic units such as *older bay mud* and *younger bay mud*. In their work on sedimentary deposits underlying San Francisco Bay, Treasher (1963) and Goldman (1967) correlated their informal *older bay mud* with the San Antonio Formation of Lawson (1914) and their *younger bay mud* with Lawson's *Bay mud*. Lawson considered his *Bay mud* and *salt-marsh deposits* to be equivalent to sediments he named the Temescal Formation (see also Trask and Rolston, 1951). A correlation chart comparing the formal stratigraphic units of Lawson (1914) with the numerous facies map units used by many USGS geologists is provided in Table 8.16-2 below. Quite simply, as used in this report, the Temescal Formation of Lawson (1914) is the equivalent of Holocene and latest Pleistocene map units; Lawson's Merritt Sand is equivalent to the slightly older marine and continental sand deposits of various authors; and Lawson's San Antonio Formation is equivalent to even older Pleistocene map units, including the Colma Formation of Schlocker et al. (1958) and Schlocker (1974).

TABLE 8.16-2
Tentative Correlation of Quaternary Stratigraphic Units Exposed on San Francisco Bay Area Alluvial Fans and Bay Plains.

Formal Map Units of Lawson (1914)	Equivalent Informal Map Units
Temescal Formation	Alluvium (Qal), sedimentary deposits undifferentiated (Qu), bay mud (Qm), beach deposits (Qb), dune sand (Qd), sand dune and beach deposits (Qs), slope debris and ravine fill (Qsr), younger alluvial fan deposits (Qyf), younger (inner) alluvial fan deposits (Qyr), younger (outer) alluvial fan deposits (Qyfo), basin deposits (Qb), colluvium (Qcl), younger fluvial deposits (Qyfo), interfluvial basin deposits (Qb), alluvial fan and fluvial deposits (Qhaf), levee deposits (Qhl), floodplain deposits (Qhfp), floodbasin deposits (Qhb), floodbasin deposits (salt-affected) (Qhbs), and estuary deposits (Bay mud) (Qhbm)
Merritt Sand	Sand deposits stratigraphically between younger and older bay mud
San Antonio Formation	Older alluvial fan deposits (Qof), alluvial fan deposits (Qpaf), older mud (Qom), coarse-grained older alluvial fan and stream terrace deposits (Qof), fine-grained older basin and alluvial fan deposits (Qob), Colma Formation (Qc), and marine terrace deposits (Qmt)

This simplified subdivision of the alluvial fan and bay mud deposits used in this report appears to be defensible not only on the bases of stratigraphic superposition, topographic expression, and the presence or absence of deformation, but also on the basis of fossil content. From his survey of vertebrate faunas from the non-marine Quaternary deposits of the San Francisco Bay region, Savage (1951) concluded that only two divisions could be recognized. He named the earlier Pleistocene fauna the Irvingtonian North American Land Mammal Age and the later Pleistocene and Holocene fauna the Rancholabrean North American Land Mammal Age. As used in this report, the older San Antonio Formation is believed to be entirely Irvingtonian in age and the younger Merritt Sand and Temescal Formation are entirely Rancholabrean in age.

Deformed gravels with interbedded sand and clay in the San Francisco area here referred to the San Antonio Formation have yielded an abundant Middle Pleistocene Irvingtonian fauna (Savage, 1951; Wahrhaftig et al., 1963; Jefferson, 1991a; 1991b). These fossiliferous deposits were called the Irvington Gravels by Savage (1951), a name which was accepted as a formal designation by Hall (1958) and Christensen (1987). The Irvington Gravels are distinctly folded and the strata dip as much as 20° to 25° (Savage 1951, Louderback 1951, Hall 1958). Unconformably overlying the Irvington Gravels are comparatively flat-lying layers of younger alluvium. From my assessment of the stratigraphy and paleontology of the San Francisco Bay area, it appears that Savage's (1951) Irvington Gravels may be the coarse-grained, proximal alluvial fan deposits of the San Antonio Formation and the overlying, undeformed layers of younger alluvium the equivalent of the Rancholabrean-age Merritt Sand and/or Temescal Formation.

Lawson's (1914) Alameda Formation does not crop out in the immediate vicinity of the proposed project (Bonilla, 1971; Schlocker, 1974; Brabb and Pampeyan, 1972), and, thus, is not considered further in this discussion. Sedimentary rocks of Tertiary age, which might be expected to underlie the Quaternary-age San Antonio Formation, are also not known to occur within the vicinity of the SFERP site.

8.16.3.4.2 Site Geology. The SFERP site and vicinity is located within the "Hunters Point Shear Zone" (Schlocker, 1974), a Jurassic-age fault zone that trends northwestward across the San Francisco Peninsula. This fault zone has been repeatedly reactivated and deformed by translational movement along the San Andreas Fault system (Wakabayashi, 1992). Movement along this fault zone over time has resulted in rocks being intensely fractured and sheared. Similar major shear zones are found throughout the Bay area. The Hunters Point Shear Zone is over one mile wide and contains a melange of various rock –types, but is characterized by the metamorphic rock serpentinite (Schlocker, 1974).

As mapped by Lawson (1914; 1:62,500 scale), Brabb and Pampeyan (1972; 1:62,500 scale), Lajoie et al. (1974; 1:62,500 scale), Schlocker et al. (1958; 1:24,000 scale), Bonilla (1971; 1:24,000 scale), Schlocker (1974; 1:24,000 scale), and Radbruch and Schlocker (1958; 1:12,000 scale), both the site proposed for SFERP construction and the proposed route of the water pipeline are located primarily on artificial fill overlying either rocks of the Franciscan Complex or late Pleistocene to Holocene alluvium of the Temescal Formation. In the subsurface, the Temescal Formation overlies in sequence the Merritt Sand, San Antonio Formation, and Franciscan Complex. Each of these stratigraphic units will be individually discussed below, from oldest to youngest.

8.16.3.4.3 Franciscan Complex. Bedrock in the vicinity of the SFERP site is composed of sandstone, shale, siltstone, and volcanic rocks, with lesser amounts of conglomerate, limestone, radiolarian chert, greenstone, schist, and serpentinite, named the Franciscan Complex (also known as the Franciscan Formation, Franciscan Series, Franciscan Group, and Franciscan melange). The Franciscan Complex is an unnatural or artificial assemblage of variably deformed and metamorphosed rock units that formed in a subduction zone at the western edge of the North American Plate (Hamilton, 1969; Page, 1981; Wakabayashi, 1992). Franciscan lithologies are predominantly sedimentary rocks with subordinate volcanic rocks that are believed to represent trench fill and volcanic islands, respectively. Although they are uncommon, fossils have been very important in unraveling the ages, depositional environments, and tectonic history of these Franciscan Complex rocks. Major unanswered questions and heated controversy regarding the history of the Franciscan Complex remain (Wakabayashi, 1992).

Within the Franciscan Complex are numerous fault-bounded blocks, each with a distinctive lithology, age, metamorphic grade, and structure, that have been termed tectonostratigraphic terranes (Blake et al., 1982). The San Francisco Peninsula is composed of several coherent tectonostratigraphic terranes separated by major fault zones. The northwest-southeast trending Hunters Point Shear Zone separates the Alcatraz Terrane to the northeast from the Marin Headlands Terrane to the southwest. The Alcatraz Terrane is composed primarily of early Cretaceous-age sandstones and shales, while the Marin Headlands Terrane contains late Cretaceous-age volcanic rocks (metamorphosed to greenstone) and banded radiolarian cherts. The ages of rocks in the Alcatraz and Marin Headland Terranes is based on fossils (Blake et al. 1982; Wakabayashi, 1992). The predominant rock type found within the Hunters Point Shear Zone is serpentinite, with occasional tectonic blocks of sandstones and shales of the Alcatraz Terrane.

Lawson (1895) first named these rocks the Franciscan Series and then later (Lawson, 1914) used the name Franciscan Group. He designated San Francisco as the type area, stating that "the Franciscan group was named from San Francisco, where it occurs in extensive exposures...." Lawson (1895) originally divided the Franciscan Series/Group into five formations. However, after 60 years of further study, Schlocker (1974) considered these formations obsolete and suggested that they be abandoned. Schlocker (1974) and many earlier workers used the name Franciscan Formation. However, because the stratigraphy of Franciscan-age rocks is not at all simple, most geologists now working in the San Francisco area prefer to use the term Franciscan Complex for this complex assemblage of dissimilar rocks.

Ages of Franciscan Complex rocks vary from place to place (Fox, 1983). Based primarily on fossil evidence, rocks in the sequence have been dated as Jurassic, Cretaceous, and Tertiary. On the San Francisco Peninsula, Franciscan Complex sedimentary facies of the Alcatraz and Marin Headlands Terranes are Cretaceous in age (Schlocker, 1974).

According to Spaulding (2000), Franciscan Complex bedrock occurs at depths less than 5 feet below the ground surface in the western half of the Potrero PP site. However, to the east and closer to the waterfront, serpentinite occurs at depths up to 85 feet below ground surface. Excavations for construction of the SFERP proposed to be built in the southwestern corner of the Potrero PP site would impact Franciscan Complex rocks.

Unconformably overlying the Franciscan Complex basement rocks in the proposed project area are estuarine sediments of Pleistocene age often informally referred to as "older bay mud" and formally known as the San Antonio Formation.

San Antonio Formation. The oldest sediments overlying the Franciscan Complex basement rocks are here referred to the San Antonio Formation. Lawson (1914) applied the name San Antonio Formation to alluvial deposits older than and immediately underlying the Merritt Sand. Strata comprising the San Antonio Formation have been deformed by frequent tectonic activity and are often recognizable from the overlying Merritt Sand and Temescal Formation by their non-flat-lying attitude (Savage, 1951). This older stratigraphic unit is also more consolidated or cemented and, therefore, often has a distinct topographic expression. Lawson (1914) stated that since its deposition, the San Antonio Formation has been thoroughly dissected and terraced. Thus, as San Antonio Formation deposits were exposed by lowering of sea level and tectonic uplift, streams cut below the surface, leaving many remnants preserved as topographic highs (Robinson, 1956). In the time period separating deposition of sediments now referred to as the San Antonio and Temescal Formations, coarser sediments named the Merritt Sand and Colma Formation were deposited.

Many areas on the San Francisco Peninsula have alternated between being submerged beneath the Bay and being dry land in response to glacially controlled fluctuations of sea level and tectonic uplift. Depending on whether they were deposited during a high or low sea level stand, sediments of the San Antonio Formation were deposited in environments varying from estuarine and intertidal mud flats to swamps and slow flowing streams.

The San Antonio Formation is probably early to late Pleistocene in age (Louderback, 1951). Stirton (1939) described an early Pleistocene fossil fauna from gravels exposed near Irvington, on the eastern side of the San Francisco Bay. Later, Savage (1951) named this site the type locality for the Irvingtonian North American Land Mammal Age (NALMA). Lithologically similar sediments of the San Antonio Formation that occur elsewhere in the San Francisco Bay area have also yielded Irvingtonian-age land mammal fossils and, therefore, are probably age-equivalent.

Sediments of the San Antonio Formation are not known to underlie the SFERP site, and even if they were to exist, they would be at a depth greater than 35 feet. Thus, it is unlikely that they would be impacted except in the deepest excavations during SFERP construction. These "older bay muds" could be encountered during deep augering for the placement of concrete piers or support piles in the southwestern corner of the proposed SFERP site.

Merritt Sand. Trask and Rolston (1951) named the sand below "younger bay mud" the Merritt Sand. In their study of Quaternary sediments in the Islais Creek Basin (which includes the SFERP site), Radbruch and Schlocker (1958) simply designated equivalent deposits "the sand layer" but did correlate it with the Merritt Sand. Where not eroded away during the sea-level low stand following deposition, the Merritt Sand separates deposits of the San Antonio and Temescal Formations. On the east side of San Francisco Bay, Radbruch (1957) showed that the marine type Merritt Sand grades into and interfingers with alluvial-fan deposits of the Temescal Formation. Schlocker et al. (1958) named equivalent sands exposed on the San Francisco Peninsula the Colma Formation, while clearly stating that at least the marine portion of the Colma was "correlated with the Merritt Sand." Since the Merritt Sand was named first and, therefore, has precedence, this report uses the Merritt

Sand as the formal name for the predominantly sandy deposits that unconformably overlie sediments of the San Antonio Formation. Although it may grade into and even locally interfinger with sediments of the overlying Temescal Formation (Radbruch 1957), both in outcrop and in the subsurface "this sand layer" is a distinctive stratigraphic unit (Radbruch and Schlocker, 1958).

The Merritt Sand found in the vicinity of the SFERP site is a complex of Pleistocene marine and coastal sediments, including some interbedded gravel, silt, and clay beds. The environment of deposition of Merritt Sand deposits varies greatly over short distances. Depending on whether they were deposited during high or low sea-level, the environment in which they were deposited could vary from offshore marine, estuarine, lagoonal, beach, paludal (swamp), lacustrine (lake), fluvial (stream), flood plain, to dunes (Lawson, 1895; Martin, 1916; Schlocker, 1974). The Merritt Sand was encountered in a geotechnical borehole in the southwestern corner of the SFERP site, and, thus, could be impacted by deep augering for the placement of concrete piers or support piles in this vicinity.

Temescal Formation. Late Pleistocene and Holocene age younger alluvium in the San Francisco Bay area was named the Temescal Formation by Lawson (1914), who included within this formation alluvial deposits younger than and overlying the Merritt Sand. These younger alluvial deposits developed in part from the erosion and redeposition of older alluvium. The principal differences between the younger and older alluvium are stratigraphic position (separated by the Merritt Sand), lithologic components, degree of consolidation, topographic expression, attitude (tilted versus flat-lying), and fossil content. According to Savage (1951), sediments in the San Francisco Bay area containing latest Pleistocene and Holocene fossil faunas can often be distinguished from the older Pleistocene deposits because they are relatively flat-lying, while, in contrast, the older sediments containing early Pleistocene fossil faunas are often slightly tilted. This criterion has also been helpful to others in distinguishing older alluvium from younger alluvium (see Taliaferro, 1951; Hall, 1958; and Helley et al., 1972). According to Taliaferro (1951), the tilting of early Pleistocene sediments is a direct result of the mid-Pleistocene orogeny (but see Christensen [1987] for a contrary view).

Like sediments referred to as the "older bay mud" or San Antonio Formation, depending on whether they were deposited during high or low sea level, the depositional environment of Temescal Formation sediments varies from estuarine to swamp to stream.

The age range for sediments referred to the Temescal Formation is late Pleistocene to Recent. Kvenvolden (1962) reported radiocarbon dates on samples collected 11 to 20 feet below the surface ranging from about 6,000 to 8,000 years before present. Story et al. (1966) reported radiocarbon ages ranged from 2,500 to 7,500 years for samples collected between 2 and 50 feet below the surface. Schlocker (1974) expressed the opinion that sediments here referred to the Temescal Formation were deposited after the Wisconsin Glaciation about 14,000 years ago, when sea level began to rise with the melting of glacial ice.

Geotechnical investigations reveal that sediments referable to the Temescal Formation underlie artificial fill at a depth below about 20 feet in the southwest corner of the SFERP site. Thus, this stratigraphic unit could be impacted by excavations for the SFERP proposed to be built in this corner of the site. Augering for concrete piles or support piers in this area could impact sediments of the Temescal Formation.

As mapped by Schlocker (1974; 1:24,000 scale), Bonilla (1971; 1:24,000 scale), and Radbruch and Schlocker (1958; 1:12,000 scale), the route of the water pipeline traverses sediments referable to the Temescal Formation. Thus, this stratigraphic unit could also be impacted by trenching for burial of the water pipeline.

Artificial Fill. Artificial fill is extensive along the margins of San Francisco Bay. The practice of creating land by dumping artificial fill on the gently sloping tidal flats along the eastern margin of the San Francisco Peninsula began about the time of the Gold Rush, when San Francisco became a booming center of growth and needed room to expand, particularly along the waterfront. Over time, more than 3 square miles of the most valuable land in San Francisco originated in this way (Schlocker, 1974). For fill, developers used whatever materials were available, including dune sand, alluvium, sediment dredged from the Bay, spoils from excavations, solid rock from quarries, and man-made debris, including foundry slag and garbage. Both the thickness and type of fill vary widely over short distances.

Artificial fill of varying depth underlies the entire Potrero PP site (Spaulding, 2000). Geotechnical borehole logs indicate that fill thickens from west to east. It is as shallow as 1 foot in the northern part of the SFERP site and as deep as 20 feet in the southeastern part. In the vicinity of the site proposed for SFERP construction, artificial fill unconformably overlies either serpentine bedrock or bay mud referable to the Temescal Formation.

8.16.3.4.4 Paleontological Resource Inventory. An inventory of the paleontological resources of the stratigraphic units in or near the proposed project site is presented below and the paleontological importance of these resources is assessed. The literature review and UCMP archival search conducted for this inventory documented no previously recorded fossil sites within the very limited footprint of the SFERP site. However, each of the stratigraphic units that could possibly be impacted by construction of the SFERP facilities has produced significant and scientifically important fossils in the San Francisco area. Fossil sites were documented as occurring near the proposed SFERP. These known fossils and localities are briefly described below starting with those from the oldest stratigraphic unit.

Franciscan Complex. Low-grade metamorphic rocks of the Franciscan Complex have produced highly significant fossils at numerous localities in the past. Schlocker (1974) referred to the "scarcity of fossils" in rocks of the Franciscan Complex and even wrote: "fossils are almost nonexistent." Yet, in the same publication he also emphasized the importance of fossils in unraveling the ages, depositional environments, and tectonic history of the Franciscan Complex. Schlocker et al. (1958) reported a Cretaceous ammonite found in shales of the Alcatraz Terrane within northeastern San Francisco. Schlocker (1974) also referred to fossil plant remains in Franciscan rocks, although usually with such terms as "carbonaceous matter," "lignitic material," "large carbonaceous particles and layers," "large abundant paper-thin flakes of coaly material...," or "carbon having relict plant-cell structures." Lastly, Schlocker (1974) reported "curved thin shells...that resemble chitinous parts of arthropods and tiny shark's teeth." The latter are the only reported vertebrate fossils from the Franciscan Complex.

Fossils have also been reported in Franciscan rocks by many other geologists and paleontologists. As the name implies, radiolarian chert beds in the Franciscan Complex produce radiolarian microfossils important as biostratigraphic markers. Fossil radiolaria were first described from Franciscan rocks by Hinde (1894) and later by Riedel and

Schlocker (1956). Schlocker (1974) wrote: "In some chert beds fossils are so crowded that they touch each other." Limestone nodules and concretions in Franciscan shales often also contain abundant radiolaria (Schlocker, 1974). Fossil foraminifera have also been reported from Franciscan limestone (Kupper, 1956). Fossil gastropods (snails) and pelecypods (clams) have also been reported from a locality on Alcatraz Island and elsewhere by Gabb (1869), Stewart (1930, Anderson (1938), and Ghent (1963). Plant microfossils (pollen and spores) and marine algal cysts of dinoflagellates have also been reported from Franciscan shales (Evitt and Pierce, 1975; Damassa, 1979a, 1979b; Blake et al. 1984). The latter were instrumental in determining that some rocks included in the Franciscan Complex are as young as early Tertiary.

Locally, the Franciscan Complex contains a melange of various rock-types that vary irregularly over short distances (Schlocker, 1974). Likewise the metamorphic grade varies in intensity from place to place (Schlocker, 1974). Geotechnical boreholes on the Potrero PP site indicate that the predominant rock type in the Franciscan Complex is serpentinite (Spaulding, 2000). However, on the northeast slopes of Potrero Hill, less than 0.5 mile west of the SFERP site but still within the Hunters Point Shear Zone, the Franciscan Complex consists of low metamorphic grade sedimentary rocks referred to as "sandstone and shale" by Radbruch and Schlocker (1958) and as "sandstone" by Schlocker (1974). During the field survey for this assessment, an outcrop of nonfossiliferous, arkosic sandstone was discovered on 20th Street between Pennsylvania and Mississippi Streets, approximately 0.5 mile west of the SFERP site.

San Antonio Formation. Fossils from the San Antonio Formation are early Pleistocene in age and equivalent to those reported from the Irvington Gravels. The mammals collected from these units include mammoths, musk oxen, horses, peccaries, camels, deer, elk, pronghorns, ground sloths, saber-tooth cats, dire wolves, coyotes, foxes, gophers, mice, and squirrels (Peabody, 1945; Savage, 1951; Stirton, 1951; Louderback, 1951; Hall, 1958).

When naming the San Antonio Formation, Lawson (1914) noted that this unit contained bones of extinct vertebrates, including ground sloth, bison, mammoth, mastodon, horse, camels, and large carnivores. Savage (1951) questioned the exact stratigraphic position from which some of these specimens were obtained. Helley et al. (1972) also noted that the older alluvial fan deposits (San Antonio Formation of this report) locally contain concentrations of continental vertebrate and invertebrate fossils, and that their older mud map unit (also included in the San Antonio Formation) contained continental vertebrate fossils, freshwater invertebrate fossils, and plant remains.

Stirton (1939) described an early Pleistocene fauna from gravels exposed along the scarp of the Hayward Fault near Irvington, on the eastern side of the San Francisco Bay. Later, Savage (1951) named this site the type locality for the Irvingtonian NALMA. Lithologically similar and probably age-equivalent gravels occur elsewhere in the San Francisco Bay area. These gravels have also yielded Irvingtonian-age land mammal fossils (for instance UCMP localities V-6322, V-3602, V-3604, and V-3605) and are probably correlative with the Irvington Gravels.

Merritt Sand. Quaternary sediments referred to as the Merritt Sand or the equivalent Colma Formation have produced significant marine and terrestrial fossils in the past. Rodda and Baghai (1993) reported bones and teeth of mammoths and bison from sediments they

referred to the Colma Formation. Fossil diatoms and pollen were also recovered from this site. A leg bone of a ground sloth had been previously recovered from a shallow well in this same vicinity (Winslow, 1876; Stock, 1925; Hay, 1927). Savage (1951) listed other vertebrate fossil localities in the San Francisco Bay region to which he assigned an "undifferentiated Pleistocene" age. Some or all of these additional vertebrate fossils may also be referable to the Merritt Sand. Schlocker (1974) reported fossil plant remains and a peat layer at the top of his Colma Formation. The latter he thought might represent a paleosol—"an old soil that developed in or near local marshes or lakes." The Merritt Sand has also produced marine megafossils, marine and nonmarine diatoms, and sponge spicules (Schlocker, 1974). During excavations for the Broadway Tunnel, a fossil "tree" was discovered and identified by paleobotanist Roland W. Brown as a juniper or red cedar, probably Juniperus californica (Schlocker, 1974). Wood from this tree was radiocarbon dated at greater than 30,000 years before present. Fossil mollusk shell fragments were observed in a core from a depth of approximately 30 feet in the Merritt Sand in a geotechnical borehole in the southwestern corner of the SFERP site.

Temescal Formation. An abundance of Pleistocene and Holocene fossils have been reported from sediments referable to the Temescal Formation in the San Francisco area. Hay (1927) listed numerous discoveries made between 1873 and 1927. Peabody (1945) added to this list. Surveys of Quaternary land mammal fossils in the San Francisco Bay area have been made by Stirton (1939, 1951), Hay (1927), Savage (1951), Lundelius et al. (1983), and Jefferson (1991b), and surveys of Quaternary birds, reptiles, and amphibians have been made by Miller and DeMay (1953) and Jefferson (1991a).

The Temescal Formation has yielded fossil remains of petrified wood; shells of clams and oysters; and the bones and/or teeth of bony fishes, amphibians, reptiles, birds, and a diversity of extinct land mammals, including ground sloths, mammoths, mastodonts, deer, moose, horses, camels, and bison (Hay, 1927; Stock, 1925; Miller and Peabody, 1941; Savage, 1951; Jefferson, 1991b; UCMP records). These fossils from the Temescal Formation are late Pleistocene to Holocene (Rancholabrean NALMA) in age. The age of these Rancholabrean faunas is based on the presence of fossil Bison and many mammalian species that are inhabitants of the same area today.

Fossils recovered from Temescal Formation sediments at sites in the area around San Francisco Bay include microfossils useful in paleoenvironmental reconstructions (radiolaria, foraminifera, sponge spicules, coccoliths, diatoms, dinoflagellates, pollen, and spores), marine invertebrates (gastropods, pelecypods, and bryzoa), and both marine and terrestrial mammals (Atwater et al., 1977). Schlocker (1974) has also reported fossil plant remains from Temescal-equivalent sediments he referred to as "Bay mud and clay." Bonilla (1971) reported fossil shells and plant remains from "Bay mud" here referred to the Temescal Formation.

A number of previously recorded fossil sites in the Temescal Formation are reported as having been uncovered by earth moving associated with previous construction projects (Radbruch and Schlocker, 1958; Jefferson, 1991a, 1991b, Rodda and Baghai, 1993; UCMP records) including the Bay Bridge, Bay Shore Southern Pacific Tunnel, Twin Peaks Tunnel, construction of an office building on Pacific Street, and construction of the Southeast Sewage Treatment Plant (now known as the Southeast Water Pollution Control Plant).

Remains of land mammals have been found at a number of localities in younger alluvial deposits referable to the Temescal Formation (Louderback, 1951; Savage, 1951; Stirton, 1951; Jefferson, 1991b). Jefferson (1991a; 1991b) compiled a database of California Late Pleistocene (Rancholabrean) vertebrate fossils from published records, technical reports, unpublished manuscripts, information from colleagues, and inspection of museum paleontological collections at over 40 public and private institutions. He listed 10 individual sites in San Francisco County and 16 in adjacent San Mateo County that have yielded Rancholabrean vertebrate fossils, including several UCMP localities. Most, if not all, of these fossil sites would presumably be referable to the Temescal Formation as used in this report. In addition to UCMP localities, Jefferson (1991a; 1991b) listed in this area Rancholabrean-age vertebrate fossil localities of the California Academy of Science Museum (formerly the Golden Gate Memorial Museum), Academy of Natural Sciences Museum in Philadelphia, Field Museum of Natural History in Chicago, U. S. Geological Survey in Denver, U. S. National Museum in Washington, and Yale Peabody Museum.

The most common vertebrate fossils reported from Rancholabrean-age alluvial sediments in the San Francisco Bay area are the remains of extinct mammoths, bison, and horses. Radbruch and Schlocker (1958), Story et al. (1966), Goldman (1969b), and Helley et al. (1972) have noted that the Temescal Formation equivalent sediments locally also contain marine and freshwater invertebrate fossils (sponges, gastropods [snails], and pelecypods [clams and oysters]), diatoms, and plant remains.

The age of Temescal Formation deposits apparently extends from latest Pleistocene to the Holocene. Lawson (1914) referred to the Temescal Formation as entirely Holocene in age, but Louderback (1951) believed that the bulk of the younger alluvium was Pleistocene in age. Based on the presence of fossil bison, Savage (1951) referred the younger alluvium to the Rancholabrean NALMA, which spans the boundary between late Pleistocene and early Holocene.

UCMP vertebrate fossil locality V-65243, known as the Twin Peaks Tunnel site, located approximately 2.7 miles (4.3 kms) northwest of the SFERP site, produced Rancholabrean land mammal fossils from Temescal Formation sediments. In the vicinity of the Islais Creek Channel 0.5 mile south of the SFERP site, UCMP locality V-3410 yielded a Rancholabrean-age fossil fauna from sediments equivalent to the Temescal Formation. Radbruch and Schlocker (1958) also reported the recovery of fossils from borings in the Islais Creek area from bay sediments which they correlated with the Temescal Formation. Radbruch and Schlocker (1958) also reported the discovery of fossil plant remains and mollusk fossils in an excavation at the Southeast Sewage Treatment Plant (now known as the Southeast Water Pollution Control Plant). Two localities in South San Francisco (UCMP localities V-6203 and V-6319) have also produced Rancholabrean faunas, including bison and elk or moose. During construction of the San Francisco-Oakland Bay Bridge, part of a jaw of a bison with several teeth, bones and teeth of horses, and a mammoth tooth were collected from sediments considered to be late Pleistocene (Louderback 1951, Savage 1951) and probably equivalent to the Temescal Formation. These localities are now referred to as UCMP localities V-34011 and V-69186. Several additional Rancholabrean fossil faunas are located further from the SFERP site. Abundant fossil mollusk shells were observed in cores of younger bay mud from depths of approximately 20 and 25 feet in a geotechnical borehole in the southwestern corner of the SFERP site.

Artificial Fill. No fossils have been recorded from artificial fill in the San Francisco Bay area. However, since artificial fill includes sediments from the older formations discussed above, it is highly likely that such fossils exist. Such fossils would have been transported from their original source and would be lacking stratigraphic context and provenance. Therefore, they would have only limited scientific and educational value. An unconsolidated sand containing mollusk shell fragments was observed in cores from depths of approximately 10 and 15 feet in a geotechnical borehole in the south-central portion of the SFERP site. This sand was underlain by deposits of foundry slag, charcoal, and ash, clearly demonstrating that the shell-bearing sand is artificial fill.

8.16.4 Impacts

The potential environmental impacts on paleontological resources from construction and operation of the SFERP are presented in the following subsections.

8.16.4.1 Discussion of Impacts

8.16.4.1.1 Paleontological Resource Significance Criteria. In its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources: high, low and undetermined. The paleontological importance or sensitivity of a stratigraphic unit reflects (1) its potential paleontological productivity (and thus sensitivity), and 2) the scientific significance of the fossils it has produced. Thus, the potential paleontological productivity of a stratigraphic unit exposed in a project area is based on the abundance of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near that project site. The underlying assumption of this assessment method is that exposures of a stratigraphic unit are most likely to yield fossil remains in quantity (and quality) similar to those previously recorded from that unit in and near the project site.

An individual fossil specimen is considered scientifically important and significant if it is (1) identifiable, (2) complete, (3) well preserved, (4) age diagnostic, (5) useful in paleoenvironmental reconstruction, (6) a type or topotypic specimen, (7) a member of a rare species, (8) a species that is part of a diverse assemblage, and/or 9) a skeletal element different from, or a specimen more complete than, those now available for that species (SVP, 1995). For example, identifiable land mammal fossils are considered scientifically important because of their potential use in providing very accurate age determinations and paleoenvironmental reconstructions for the sediments in which they occur. Moreover, vertebrate remains are comparatively rare in the fossil record. Although fossil plants are usually considered of lesser importance because they are less helpful in age determination, they are actually more sensitive indicators of their environment and, thus, as sedentary organisms, more valuable than mobile mammals for paleoenvironmental reconstructions. For marine sediments, invertebrate fossils, including microfossils, are scientifically important for the same reasons that land mammal and/or land plant fossils are valuable in terrestrial deposits. The value or importance of different fossil groups varies depending on the age and depositional environment of the stratigraphic unit that contains the fossils.

The following tasks were completed to establish the paleontological importance and sensitivity of each stratigraphic unit exposed in or near the project site:

- The potential paleontological productivity of each rock unit was assessed, based on the abundance of fossil remains and/or previously recorded and newly documented fossil sites it contains in and/or near the project site.
- The scientific importance of fossil remains recorded from a stratigraphic unit exposed in the project site was assessed.
- The paleontological importance of a rock unit was assessed, based on its documented and/or potential fossil content in the project site and surrounding area.

This method of paleontological resource assessment is the most appropriate because discrete levels of paleontological importance can be delineated on a topographic or geologic map.

Under SVP (1995) standard guidelines, stratigraphic units in which fossils have been previously found are deemed to have a high sensitivity and a high potential to produce additional fossils. In areas of high sensitivity, full-time monitoring by a professionally trained paleontologist is recommended during any project ground disturbance. Stratigraphic units that are not sedimentary in origin or that have not been known to produce fossils in the past are deemed to have low or undetermined sensitivity and monitoring is usually not recommended nor needed during project construction in these units. Stratigraphic units that have not had any previous paleontological resource surveys or fossil finds are deemed undetermined until surveys and mapping are done to determine their sensitivity. After reconnaissance surveys, observation of exposed strata, and possibly subsurface testing, a qualified paleontologist can usually determine whether the stratigraphic unit should be categorized as having high, low, or undetermined sensitivity; that is, whether there is a high, low, or undetermined potential to encounter fossil resources during construction. In keeping with the significance criteria of the SVP (1995), all vertebrate fossils are categorized as being of significant scientific value and all stratigraphic units in which vertebrate fossils have previously been found have high sensitivity. According to SVP (1995) standard guidelines, sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, or stratigraphic data.

Using the criteria of the SVP (1995) above, the significance of the potential adverse impacts of earth moving on the paleontological resources of each stratigraphic unit exposed in and near the SFERP site was assessed. This assessment reflects the paleontological importance/impact sensitivity of the stratigraphic unit, which, in turn, reflects the potential for fossil remains and fossil sites being encountered during earth moving. However, it should be noted that any impact on a fossil site or a fossil-bearing rock unit during construction would be considered highly significant, regardless of the previously determined paleontological importance of the rock unit in which the site or fossiliferous layer occurs. For example, grading in an area underlain by a rock unit with low sensitivity would have only a low potential to disturb fossil remains (i. e., the rock unit would have low sensitivity to adverse impacts). However, the loss of any fossil remains from that rock unit would be a highly significant impact.

8.16.4.2 Paleontological Resource Impact Assessment

The significance of potential adverse impacts of SFERP project-related earth moving on the paleontological resources of the stratigraphic units likely to be disturbed at the project site is presented in this section.

8.16.4.2.1 Franciscan Complex. The predominant rock type found in Franciscan Complex rocks of the Hunters Point Shear Zone is serpentinite, although sedimentary rocks resembling those of the Alcatraz Terrane have been previously identified on Potrero Hill immediate west of the project area (Schlocker, 1974). Serpentinite is a metamorphic rock believed to have formed from either ultramafic igneous rocks or sediments high in manganese and iron and low in silica. Even though the original parent material may have been sediments, they have been subjected to high pressures and temperatures either prior to or during intrusion along fault zones. Metamorphism resulting from these high pressures and temperatures would have destroyed any fossils present. Therefore, the serpentinite basement rock in the project area is considered to have no sensitivity. However, because there is a possibility that excavations may encounter blocks of fossil-bearing sedimentary rocks such as those present on the northeast slopes of Potrero Hill less than 0.5 mile west of the SFERP site (Schlocker, 1974), overall the Franciscan Complex is still considered to have low sensitivity.

Sedimentary rocks of the Franciscan Complex have in the past produced very significant fossils, which have been important for understanding the age, depositional environments, and tectonic history of rocks in the San Francisco area. Although no previously reported fossils are known to directly underlie the proposed SFERP site, the presence of sedimentary rocks on Potrero Hill, less than 0.5 mile west of the SFERP site, suggests that there is a potential for similar rocks being uncovered during SFERP construction-related excavations. Therefore, using SVP (1995) criteria, rocks of the Franciscan Complex (not including the serpentinite) have a low sensitivity to impacts from SFERP construction. Additional fossil remains discovered in rocks of the Franciscan Complex during SFERP construction could be scientifically important and significant.

8.16.4.2.2 San Antonio Formation. A number of fossil localities are known from the San Antonio Formation in the San Francisco region, although no previously reported fossils are known to occur in this formation within one-mile of the proposed SFERP site. Nonetheless, using SVP (1995) criteria the San Antonio Formation has high sensitivity. There is only a low potential for similar scientifically important fossil remains being discovered in the deepest excavations at the proposed SFERP site. Additional fossil remains discovered in sediments of the San Antonio Formation during SFERP construction could be scientifically important and significant.

8.16.4.2.3 Merritt Sand. The Merritt Sand has produced significant fossils at numerous previously recorded fossil localities in the San Francisco Bay area, including in a geotechnical borehole at the SFERP site. The presence of these fossil sites suggests that the Merritt Sand has the potential to produce additional similar fossil remains during deep excavations at the proposed SFERP site. Therefore, the Merritt Sand possesses high sensitivity. Additional identifiable fossil remains recovered from the Merritt Sand during SFERP construction could be significant and scientifically important.

8.16.4.2.4 Temescal Formation. Sediments referable to the Temescal Formation have produced numerous significant plant, invertebrate, and vertebrate fossils at numerous previously recorded fossil sites. Several previously recorded fossil localities are found near the proposed SFERP site, including sites containing vertebrate fossils approximately 0.5 mile south of the SFERP site and less than 0.5 mile east of the water pipeline route. In addition, abundant fossil mollusks were observed in sediments of the Temescal Formation cored in a borehole in the southwestern corner of the SFERP site. The presence of these previously recorded fossil sites in sediments of the Temescal Formation suggests that there is a high potential for additional similar fossil remains to be uncovered by excavations for SFERP construction. Therefore, using SVP (1995) criteria, the Temescal Formation has high sensitivity to impacts from construction. Additional fossil remains discovered in sediments of the Temescal Formation during SFERP construction could be scientifically important and significant.

8.16.4.2.5 Artificial Fill. Although artificial fill may contain fossils transported from its source, those fossils would be lacking stratigraphic context and provenance and, therefore, would have only limited scientific and educational value. There is concurrence among paleontologists and land managers that fossils not in situ, that is those that have been removed from their initial stratigraphic context and that cannot be confidently related to a particular stratigraphic unit, are not scientifically significant. This is due to the fact that, in the absence of stratigraphic, and therefore chronologic and geologic context, a fossil cannot be used to effectively address important scientific research questions. Therefore, artificial fill possesses a low sensitivity to impacts from construction.

8.16.4.3 Summary of Paleontological Resource Assessment

Potential adverse impacts on paleontological resources resulting from construction of the proposed SFERP are summarized in this section. Potential impacts on paleontological resources resulting from construction can be divided into construction-related impacts and impacts related to plant operation. No impacts on paleontological resources are expected to occur from the continuing operation of the SFERP. However, construction-related impacts to paleontological resources could occur as a result of numerous ground disturbing or earth-moving activities during construction. These impacts could be either direct or indirect. Direct impacts would result from grading, excavations for foundations, and augering for concrete pilings at the SFERP site, trenching for burial of the water pipeline, and any other earth-moving activity that disturbed previously undisturbed fossiliferous sediments. Although earth moving associated with construction would be a comparatively short-term activity, the loss of fossil remains, unrecorded fossil sites, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata would be a long-term environmental impact.

Site grading is not expected to result in significant adverse impacts to paleontological resources, as the ground surface in the area is already relatively flat, is covered by artificial fill, and has already been disturbed by previous construction activities. Neither are the support facilities, such as temporary construction offices, proposed laydown area(s), and parking areas, expected to have a significant adverse impact on paleontological resources, as they also would be located on ground previously disturbed and will involve no significant new ground disturbance. However, excavations deeper than the artificial fill at the SFERP site could disturb potentially fossiliferous sediments of the Franciscan Complex,

San Antonio Formation, Merritt Sand, and Temescal Formation, all of which have produced significant fossils elsewhere. Deep augering for the placement of concrete piers or foundation piles for SFERP facilities and trenching for burial of the water pipeline could also disturb sediments of the Franciscan Complex, San Antonio Formation, Merritt Sand, and Temescal Formation. In conclusion, project-related ground-disturbing and earth-moving activities could potentially have adverse impacts on significant paleontological resources in any of the sediments and rocks present underlying the proposed SFERP site. However, although each of the stratigraphic units that could be impacted by construction are potentially fossiliferous and any fossils discovered could be significant and scientifically important, the overall probability of earth moving related to SFERP construction having adverse impacts to non-renewable paleontological resources is considered to be low.

8.16.5 Mitigation

8.16.5.1 Environmental Checklist

The Guidelines for the Implementation of CEQA (Public Resources Code Sections 15000 et seq.) include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: "Would the project directly or indirectly destroy a unique paleontological resource or site…?" Because of potential adverse impacts on significant paleontological resources resulting from SFERP construction, mitigation measures are necessary.

8.16.5.2 Proposed Mitigation Measures

This section describes applicant-proposed mitigation measures that would be implemented to reduce potential adverse impacts to significant paleontological resources resulting from SFERP construction. These proposed paleontological resource impact mitigation measures would reduce to an insignificant level the direct, indirect, and cumulative adverse environmental impacts on paleontological resources that might result from project construction. The mitigation measures proposed below are in compliance with CEC environmental guidelines (CEC, 2000) and with SVP standard guidelines for mitigating adverse construction-related impacts on paleontological resources (SVP, 1995; 1996).

8.16.5.2.1 Paleontological Monitoring. Prior to construction, a qualified paleontologist will be retained to both design and implement a monitoring and mitigation program. During construction, earth moving construction activities will be monitored where these activities will potentially disturb previously undisturbed sediment. Monitoring will not be conducted in areas where the ground has been previously disturbed, in areas of artificial fill, in areas immediately underlain by serpentinite, or in areas where exposed sediment will be buried, but not otherwise disturbed.

8.16.5.2.2 Paleontological Resource Monitoring and Mitigation Plan. The paleontological resource monitoring and mitigation plan (PRMMP) will include a description of where and when construction monitoring will be required; emergency discovery procedures; sampling and data recovery, if needed; preparation, identification, analysis, and museum curation of any fossil specimens and data recovered; preconstruction coordination; and reporting.

This monitoring and mitigation plan will be consistent with Society of Vertebrate Paleontology standard guidelines for the mitigation of construction-related adverse impacts on paleontological resources (SVP, 1995), as well as the requirements of the designated museum repository for any fossils collected, the University of California Museum of Paleontology at Berkeley.

Scientific recovery, preparation, identification, determination of significance, and curation into a public museum is considered by most land management agencies and by the SVP (1995) to adequately mitigate impacts to paleontological resources in most circumstances. Therefore, the implementation of these mitigation measures would reduce the potentially significant adverse environmental impact of project-related ground disturbance and earth moving on paleontological resources to an insignificant level by allowing for the recovery of fossil remains and associated specimen data and corresponding geologic and geographic site data that otherwise would be lost to earth moving and to unauthorized fossil collecting. With a well designed and implemented paleontological resource monitoring and mitigation plan, project construction could actually result in beneficial impacts on paleontological resources through the possible discovery of fossil remains that would not have been exposed without project construction and, therefore, would not have been available for study. The identification and analysis of fossil remains discovered as part of project construction could help answer important questions regarding the geographic distribution, stratigraphic position, tectonic history, and age of fossiliferous sediments in the San Francisco area.

8.16.5.2.3 Construction Personnel Education. Prior to start of construction, construction personnel involved with earth-moving activities will be informed that fossils may be encountered, on the appearance of fossils, and on proper notification procedures. This worker training will be prepared and presented by a qualified paleontologist.

8.16.5.3 Significant Unavoidable Adverse Impacts

Because potential impacts on paleontological resources resulting from SFERP construction can be mitigated to an insignificant level, the proposed project would not cause significant unavoidable adverse impacts as defined by CEQA.

8.16.5.4 Cumulative Impacts

Disturbance or destruction of paleontological resources during project excavation have the potential to contribute to cumulative impacts. Impacts from this and other projects that may take place in the reasonably foreseeable future could cumulatively result in significant, adverse impacts to paleontological resources. These impacts would include the destruction of nonrenewable paleontological resources as a consequence of disturbance by earth-moving, and the consequent loss of their scientific data and educational potential.

However, if paleontological resources are encountered during project-related ground disturbance, the potential cumulative impacts would be low, as long as the mitigation measures proposed above were fully implemented to recover the resources, they are identified, their significance is determined, a written report is prepared, and they are curated into a public museum. When properly implemented, the mitigation measures proposed above would effectively recover the value to science of any significant fossils

discovered during SFERP project construction. Thus, the proposed project would not cause or contribute to significant cumulative impacts to paleontological resources.

8.16.6 Involved Agencies and Agency Contacts

There are no state or local agencies having specific jurisdiction over paleontological resources. The CEQA lead agency having specific responsibility to ensure that paleontological resources are protected in compliance with CEQA and other applicable statutes during construction of the SFERP is the CEC. California Public Resources Code Section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the CEQA lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

8.16.7 Permits Required and Permit Schedule

No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earth moving on private or public lands, except for federal lands. Removal of paleontological resources from federal lands requires a Cultural Resource Use Permit from the Bureau of Land Management. However, since no federal lands are involved in this project, no permits will be required.

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SECTION 9.0

Alternatives

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Alternatives

9.1 Introduction

The California Environmental Quality Act (CEQA) requires consideration of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" [14 CCR. 15126.6(a)]. Thus, the focus of an alternatives analysis should be on alternatives that "could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects" [14 CCR 15126.6(c)]. The CEQA Guidelines further provide that "[a]mong the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts" (*Id.*).

- On December 4, 2002, the City and County of San Francisco (CCSF) Board of Supervisors passed Resolution 827-02 adopting an Electricity Resource Plan (revised December 2002). The Electricity Resource Plan was prepared by the San Francisco Public Utility Commission (SFPUC) and the San Francisco Department of Environment (SFE) pursuant to the requirement of Ordinance 124-01. The Electricity Resource Plan provided the context for the development of the SFERP. As is explained in Section 3.0, Purpose and Need, the Electricity Resource Plan establishes priorities and provides for the development of a portfolio of new energy resources that includes energy efficiency improvements, renewables, distributed generation using renewable and clean technologies, transmission additions and new, highly efficiency and operationally flexible generation at appropriate sites. Selected recommendations presented in the Electricity Resource Plan applicable to the proposed project are presented below.

- **Recommendation 1.B.22** - The City should expeditiously develop sufficient highly-efficient and operationally-flexible new generating resources to enable the closure of Hunters Point Unit 4 by the end of 2004. The amount of new generation needs to satisfy ISO reliability requirements based on objective load flow analyses.

- **Recommendation 1.B.23** - The City should facilitate the early retirement of Potrero Unit 3, to avoid costly upgrades and the extended operation of this outdated plant. New City power facilities used as replacement power must reduce air emissions.

- **Recommendation 1.B.25** - The quantity of new natural gas-fired generation procured by the City should be based on a CAISO-reviewed load flow study that determines the amount of power necessary to maintain system reliability while complying with all state and federal environmental regulations. All studies will be based on the latest CAISO-accepted electricity demand forecast. Whenever investment in demand-side management programs and sustainable resources can offset new fossil fuel development to meet demand forecasts, this will be the City's preferred course.

9.2 Project Objectives

The SFPUC has identified several basic objectives, based on the findings and recommendations contained in the Electricity Resource Plan, for the development of a power project. These objectives include:

1. Improve the City of San Francisco's electric reliability (consistent with ERP Recommendation 1.B.25)
2. Facilitate the shutdown of older, more polluting in-City generation (consistent with ERP Recommendation 1.B.22 and 1.B.23)
3. Minimize local impacts of electrical generation. Consistent with the recommendations of the ERP, the City of San Francisco, PG&E, and the CAISO have extensively studied the electrical infrastructure in the City of San Francisco. Section 5, Electric Transmission discusses the electrical system in the City and why the SFERP is needed, as part of a portfolio of resources, to maintain system reliability and provide for closure of existing power plants. As that section documents, the City is committed to maximizing energy efficiency improvements, developing renewable power, encouraging clean distributed generation and supporting needed transmission additions. Nonetheless, the siting of new, clean and operationally flexible generation is also necessary in order to provide for closure of the Hunters Point Power Plant in the near term, and units at the Potrero Power Plant as soon thereafter as possible, and to support operational needs. Section 3.0, Purpose and Need, explains why new generating resources are needed to achieve the City's objectives, why currently planned transmission additions are insufficient to achieve the City's goals, and how the SFERP complements City efforts to develop energy efficiency improvements, renewable resources and clean distributed generation.

The remainder of this section sets forth the alternative project sites evaluated, an evaluation of other generating and emission control technologies, and a review of additional water supply sources. Electric transmission connection alternatives are addressed in Section 5.0.

9.3 No Project Alternative

9.3.1 Description

If the No Project alternative is selected, the City would not receive authorization to construct and operate a new power generation facility. Energy required for local reliability and peaking requirements that would have been produced by the proposed facility would need to be generated by another source. As Section 3.0, Purpose and Need, describes, currently the sources of power that are available are older power generation facilities (Potrero and Hunters Point power plants). These power plants release larger quantities of NO_x than the proposed facility and have questionable reliability because they are between 27 and 45 years old.

The purpose of the SFERP is to increase the electrical system's reliability to facilitate the shutdown of older, higher polluting in-City generation.

The No Project alternative is not considered feasible because it does not meet the objectives for the development of new power generation facilities to improve local electric reliability, the objective of replacing existing, dirty generation facilities that impact low income/minority communities; and the objective of closing the Hunters Point power plant.

9.3.2 Potential Environmental Impacts

The proposed project will produce electricity to increase the local electrical system's reliability while discharging less NO_x emissions for each energy unit generated when compared to other existing, older fossil fuel generation facilities. Further, the superior operating flexibility of the proposed combustion turbines, that is, a 10-minute start versus the current 24-hour start times for Potrero 3 and Hunters Point 4, affords operators greater flexibility in dispatching plants to meet system requirements. These characteristics provide beneficial environmental impacts.

Potential environmental impacts from the No Project alternative would result in greater NO_x emissions because new power plants, including the proposed project, would not be brought into operation to displace production from older, higher NO_x-emitting plants.

9.4 Proposed and Alternative Sites

The City desires to increase the local electrical system's reliability, which will facilitate the shutdown of older in-City generation. To meet these objectives, electrical interconnection studies conducted by CAISO indicate that adding electrical generation to the PG&E's 115-kV electrical system north of the Martin Substation would increase system reliability and allow for the shutdown of older in-City generation. Recent CAISO analysis indicates that all of Hunters Point Power Plant can be retired if at least three of the four combustion turbines available to the City for development are located north of the Martin Substation.

Thus, for the three combustion turbines that comprise the SFERP, the site selection criteria used to screen project sites focused on parcels located north of Martin Substation in industrially zoned areas, near necessary infrastructure (i.e., 115-kV electrical substations and natural gas lines). The City sought to site the proposed project near a 115-kV electrical substation to avoid potential power flow imbalances that could be caused by line outages. Areas around the 115-kV substations (Larkin, Mission, Potrero, and Hunters Point) were reviewed to narrow down the best substation area to site the project, and then to identify available parcels for a power plant.

The Larkin Substation was eliminated from consideration because there is no industrially zoned land in the vicinity. While there is some industrial land adjacent to Mission Substation, the substation was eliminated from consideration to site three combustion turbines because there was insufficient land to locate multiple combustion turbines in the vicinity, and because of the expense of natural gas interconnection in the area. In addition, the Mission Substation is surrounded by commercial/residential uses. Thus, a further rationale for eliminating the Mission Substation from consideration was the potential impact on neighboring residences.

The Hunters Point Substation was eliminated from the analysis due to environmental justice concerns. Specifically, communities in the vicinity of Hunters Point Substation have borne and continue to bear the impacts from substantial industrial activity, most notably the Hunters Point Power Plant and the Southeast Water Pollution Control Plant. To ameliorate environmental

justice concerns, it has been the City's objective since 1998 to close down Hunters Point Power Plant. Given the longstanding impacts of the Hunters Point Power Plant on the local communities, and continued community concerns about the impacts from Southeast Water Pollution Control Plant, City policy makers determined to avoid siting any new City-sponsored generation in the Hunters Point area. The remaining substation, Potrero Substation, was thus identified as the most promising for interconnection of the SFERP. Although environmental justice concerns also exist with regard to communities in the vicinity of Potrero Substation, the City is seeking to address these concerns through project configuration, design and mitigation as is described in Section 4.0, Environmental Justice. Some of the benefits of the proposed project site are its proximity to the Potrero Substation and a major PG&E natural gas line.

9.4.1 The Proposed Site

The SFERP is located on the site of the former PG&E Potrero Power Plant (Potrero PP) (now owned by Mirant Potrero, LLC). This site consists of approximately 4.5 acres of industrial land surrounded by industrial development. The site is located in the City of San Francisco and is zoned for industrial use. Development of a power plant in this area would be consistent with the General Plan and zoning ordinance.

The site is adjacent to PG&E's 115-kV Potrero Substation. The existing substation has sufficient transmission capacity to serve a new 145-MW plant. Natural gas would be supplied from the PG&E main located at the corner of Illinois and 23rd streets. Additional natural gas compressors would be necessary to serve the new plant. Water supply for the proposed plant would be obtained from the City's combined sewer system via an effluent pumping station, a pipeline, and an onsite primary, secondary, and tertiary treatment system that will produce Title 22-quality recycled water. Wastewater from the plant would be returned to the combined sewer system.

The plant would be located in an industrial area of San Francisco and would be screened by several tall industrial structures. The nearest line-of-sight residential uses to the project, which are potentially sensitive noise receptors, are located approximately 1,200 feet from the project.

9.4.2 Alternative Sites

The City identified and assessed the suitability of several properties for the proposed project. As part of this assessment, it reviewed four siting options. These included siting all four combustion turbines at one site, siting three combustion turbines at one site and one combustion turbine elsewhere, siting two combustion turbines at one site and two elsewhere, and lastly, returning the combustion turbines to the State of California and not siting any combustion turbines (the No Project Alternative). After analyzing the possible variations, the City determined that siting multiple combustion turbines at one site offered several advantages; most notably, lower capital and operating costs, and reduced permitting and construction schedules. However, in order to distribute the impacts of power generation more equitably, the City is currently proceeding with siting three units at the Potrero site and is exploring alternative sites for the fourth unit.

Four sites were identified as potentially suitable to site multiple turbines. Figure 9-1 (figures are located at the end of this section) shows the location of the alternative sites that were potentially suitable for construction of SFERP.

9.4.2.1 Alternative Site Selection Criteria

The criteria developed to evaluate the alternative sites' suitability for the SFPUC correspond with the reasons the proposed site was selected. These criteria include the following:

- Environmental justice considerations
- Availability of sufficient land area
- Proximity to an existing substation
- Proximity to PG&E main gas pipeline
- Consistency with the General Plan and zoning ordinances, height restrictions, and existing land uses
- The ability, with implementation of reasonable mitigation measures, to have a less-than-significant impact on the environment
- Location in area appropriate for industrial development

The alternative site locations, shown in Figure 9-1, were evaluated using the above criteria. The site characteristics are summarized in Table 9-1 and described in the following subsections.

TABLE 9-1
Comparison Using Site Selection Criteria

Alternative Site	Site Size (acres)	Land Use Compatibility	Available Linear Facilities[a]		Distance to Residential[b]
Potrero Power Plant (proposed site)	4.5	Zoned: Industrial	W: G: T:	1.0 mile <0.1 mile <0.1 mile	600 feet
Western Pacific Site	9	Zoned: Industrial; undeveloped	W: G: T:	<0.9 mile <0.4 mile 0.8 mile	2,100 feet
Port of San Francisco's Pier 70	5	Zoned: Industrial; developed and part of historic district	W: G: T:	<1.3 mile <0.2 mile <0.1 mile	1,000 feet
Cesar Chavez Street	2.8	Zoned: Industrial	W: G: T:	<0.8 mile <0.4 mile <1.0 mile	1,300 feet
Illinois Street	11	Zoned: Industrial; developed	W: G: T:	<1.1 mile <0.1 mile <0.1 mile	500 feet

Notes:
[a] W: = recycled water; G: = natural gas; T= transmission.
[b] Distances rounded to the nearest 100 feet.

9.4.2.2 Alternative Site Description

In this section, each of the alternative sites is described and analyzed based on its feasibility for use. Environmental considerations are presented in Subsection 9.4.3. The City's rationale for selecting the Potrero Site is summarized in Subsection 9.5.

9.4.2.2.1 Western Pacific Site. The Western Pacific site is located south of the proposed project site on a 9-acre parcel within the San Francisco Port Commission's jurisdiction. The project site is largely undeveloped and borders the San Francisco Bay on the northern and eastern edges. The site is zoned Heavy Industrial and is surrounded with industrial facilities. The Port of San Francisco's Pier 80 marine terminal is located immediately adjacent and to the south; other industrial uses are located north of the site, and San Francisco MUNI is planning to site a new streetcar maintenance facility due west of the site. The site is near PG&E's 115-kV Substation, PG&E natural gas pipeline, and the proposed location of the water pumping station. The nearest residential receptors are located approximately 4,000 feet from the site.

The site is currently in the state land trust and is subject to the public trust for navigation, waterborne commerce and fisheries. The Port plans to develop and integrate the Western Pacific Site into its Pier 80 operations through creation of a Pier 80 Terminal Complex, to add open yard and covered shed space to accommodate cargo distribution, assembly and processing related to the Pier 80 terminal operations. The siting of the project at this location may not be compatible with the Port's plans to enhance its marine terminal capabilities at Pier 80. In addition, although electric power plants that depend upon Bay water to operate have been permitted on trust lands, the proposed project does not require a waterfront location for its operation. The common law Public Trust doctrine, and the cases interpreting the doctrine, recognize that trust lands may be used for purposes that are not inherently water dependent, but that directly promote trust purposes. Examples of this type of use would be cargo warehouses or railroad terminals. Since the proposed project does not clearly satisfy the criteria for trust permitted uses, a proposed use of the Western Pacific site for this purpose would be subject to scrutiny by the Attorney General, who is charged with enforcement of trust restrictions, and the State Lands Commission, a state agency responsible for overseeing local trust grantees. Given the issues of compatibility with the Port's marine terminal plans, and the uncertainty as to consistency of the use under the trust doctrine, the entitlement process for the project use at this location would be lengthy, and the outcome uncertain.

9.4.2.2.2 Port of San Francisco's Pier 70. The Port of San Francisco's Pier 70 site is located adjacent to and north of the Potrero PP site. The site is a 5-acre parcel of industrial land in an area zoned Heavy Industrial. This land is currently used by the City's car towing contract operator for vehicle storage. The site is near PG&E's Potrero 115-kV Substation and natural gas pipelines.

Property surrounding the site is used for industrial/commercial uses, with the Potrero PP located immediately south; the Port of San Francisco surrounds the site on the north, east, and west.

The nearest residential receptors are located approximately 1,000 feet from the site.

The Pier 70 site was acquired by the San Francisco Port Commission from Bethlehem Steel Corporation, and is held subject to the terms of a statutory trust grant (California Statutes of

1968, Chapter 1333, the Burton Act). This particular site was not historically tide or submerged land, and thus is not subject to the common law use restrictions imposed under the Public Trust doctrine. However, once acquired by the Port, the property's use was limited by the Burton Act. This Act authorizes the Port Commission to lease land for non-trust purposes, if the property is not required for the trust purposes specified in the statute, provided that the use is in the public interest. The San Francisco Charter adds an additional condition, requiring the Port to obtain maximum profit from the use of lands deemed surplus to the needs of the trust, so that the revenue can be used to support the Port's public trust objectives.

This portion of the Pier 70 complex is currently occupied in part by a group of structures referred to as the Building 12 complex. Pier 70 is the site of an industrial complex of about 30 buildings associated with the former Union Iron Works and Bethlehem Steel Shipyard. This complex has been the subject of several historical resources surveys that have consistently determined that the area is potentially eligible for the National Register of Historic Places as a historic district. To be compatible with the area's status as a potential historic district, the combustion turbines would need to be erected within the Building 12 complex and the complex would need to be rehabilitated to retain its historic character. There is community resistance to this location due to the desire to see it later developed as part of the historic district redevelopment.

9.4.2.2.3 Cesar Chavez Site. The Cesar Chavez site is located near the Port of San Francisco's container terminal, near the Western Pacific site. The site is developed and zoned Heavy Industrial. The surrounding land uses are industrial, with the Port's container terminal located to the south, industrial uses to the north, and MUNI is planning to site a new streetcar maintenance facility due west of the site. The site is 2.8 acres, and includes a building that would require demolition.

The nearest residential receptors are located approximately 1,300 feet from the site.

The site is near PG&E's Potrero Substation and natural gas pipeline and water supply and discharge would be via the combined sewer system.

A major disadvantage of the Cesar Chavez site is that the owner has not shown any interest in selling the property to the City notwithstanding a number of overtures by the City to commence negotiations. Moreover, according to the owner, the title to the property may become disputed as it is community property and the owner has been in the process of a divorce.

A further disadvantage of the property is that the parcel size is considered small, and at best minimally adequate for the installation of the SFERP. The small size would require designing the power plant with a compressed layout. This effort would increase construction and maintenance costs for the project. In addition, there would be no space available for a water treatment facility, requiring that this equipment be located elsewhere.

9.4.2.2.4 Illinois Street Site. The Illinois Street site is located south of the proposed project site. The site is approximately 11 acres of developed land that is zoned heavy industrial and is surrounded by industrial uses to the north, south, and east, with commercial/industrial land uses to the west. The presence of existing structures on the site will require demolition and the site is within 500 feet of residential areas.

The site is near PG&E's Potrero Substation and natural gas pipeline and water supply and discharge would be via the combined sewer system.

Ownership of the Illinois Street site is complex, involving a variety of owners and real estate trusts. These entities, as represented by the managing owner, have not appeared very interested in selling the property to the City. Moreover, the shape of the parcel is irregular, including a large amount of land that would be of little use to the City and that contains buildings of potential historic importance, most notably warehouses from the sugar refinery. In preliminary negotiations, the City was informed that if they proceeded with a transaction at all, the owners would likely insist on sale of the entire parcel because fragmentation would likely render the remaining property unsaleable. Thus, the cost to the City would likely increase because the City would be required to buy more property than it needs.

9.4.3 Environmental Considerations

In this section, the potential environmental impacts of the four alternative sites and the No Project Alternative are discussed. Potential environmental impacts from use of the proposed site are presented in more detail in each of the 16 environmental subsections of Section 8 of the AFC. Table 9-2 (located at the end of this section), provides a summary of the impacts of each alternative site compared to the proposed site. The No Project Alternative would not meet the basic project objectives of the City of shutting down Hunters Point and maintaining reliability. Although the No Project Alternative would not result in the impacts associated with the SFERP, environmental impacts from the No Project Alternative could be more severe to the extent that as a result of the No Project Alternative, existing dirtier in-City generation continues to be operated within San Francisco.

9.4.3.1 Air Quality

The plant's configuration and operation would be essentially the same from an air quality perspective at every location. The type and quantity of air emissions from the alternative sites would be identical. However, the impacts on the human population and the environment may differ slightly because of the location of residences and other human uses in the project vicinity. Local terrain is similar at all sites and not likely to change impacts. All of these sites are in the same air basin and offsets acquired by the City would be equally appropriate for every site. Potential impacts of the project to residents are discussed in Subsection 8.6, Public Health, and potential impacts on wildlife are discussed in Subsection 8.2, Biological Resources.

With the No Project Alternative, air quality in the Bay Area Air Quality Management District would be slightly worse than with the project. There would be no permanent reduction in air pollutants resulting from the purchase of emission reduction credits. The in-City generation required to maintain electrical reliability would have to be provided by the existing, older generating plants. These older generating plants would create more air pollution than the proposed project. Thus, overall, the air quality would be worse than if the plant were built.

9.4.3.2 Biological Resources

As the proposed site and all of the alternative sites are urban—developed sites with little biological habitat value—the potential biological impacts associated with the development of a power plant on each of these sites would be similar. These potential biological impacts are

associated with the power plant features and not necessarily the habitat value of the sites. The biological impacts presented for the proposed site (presented in Section 8.2.4 of the AFC) would be expected for all of the alternative sites. These impacts would include air quality impacts to sensitive habitats (none are present in the local area), noise and light emissions from the power plant, collision and electrocution potential for tall project features.

The No Project Alternative would result in the continued operation of older in-City power plants, which would resulting is higher levels of air pollutants emitted per unit of electricity produced. Additionally, these older power plants use bay waters for their once-through cooling systems. These cooling systems are known to entrain aquatic species in the cooling water, which would result in higher biological impacts relative to the development of a new power plant that would use recycled water in the cooling water system.

9.4.3.3 Cultural Resources

The area surrounding the alternative sites, Potrero Point, has been the site of industrial activities since the late 1850s. The area has supported such industries as gun powder magazines, sugar processing, electrical and city gas generation, and shipbuilding. Based on literature searches, no prehistoric cultural resource sites were identified in the area. However, research indicated that prehistoric Native American populations heavily used the entire shoreline of San Francisco Bay. Therefore, the potential to encounter prehistoric cultural resources on the alternative sites is similar.

The entire Potrero Point area has had industrial activity over the last century. There is a moderate potential of encountering buried historical resources during construction of a power plant at all of the alternative sites. During test trenching conducted in 1979 by Wirth and Associates, a portion of a powder magazine was encountered. Therefore, the potential to impact buried historic resources in the area of the alternative project sites is deemed similar.

The Potrero project site has two buildings onsite that CEC staff has previously found to be eligible for historic status (the Compressor House and Meter House). Siting the SFERP at the Potrero site requires demolition of the Compressor House and Station A. However, by retaining the Meter House, the SFERP provides some mitigation for the impact of the demolition of the Compressor House and Station A. Additionally, the siting of a power plant on this site could change the existing setting of the Union Iron Works Pier 70 Historic District, located north of the proposed site. However, a power plant on the Potrero PP site would result in a minor alteration in the setting of this large potentially historic district, and would not be significant.

The Port of San Francisco's Pier 70 site includes part of the Union Iron Works Pier 70 Historic District, which consists of 23 buildings and structures. If construction of a power plant on this site could be accomplished within an existing structure without significantly altering the structure, then the impact could be lessened. However, construction of a power plant within an existing historic structure would result in a considerable increase in the power plant construction costs. Furthermore, even with treatment of those features extending outside of the existing structure, some change in the setting and feel could occur to the historic district.

The Illinois Street property includes potentially historic sugar warehouses. However, it is unlikely that these properties would have to be demolished to accommodate a power plant on the property.

Thus, the cultural impacts on alternative sites would be most severe at the Pier 70 property, followed by the Potrero property. Impacts on the Illinois, Western Pacific and Cesar Chavez properties would be substantially similar.

9.4.3.3.1 Land Use. The proposed and alternative project sites are located in San Francisco and are zoned Heavy Industrial. The siting of a power plant on any of the alternative sites is consistent with current zoning. However, the Port of San Francisco's Pier 70 property is part of an area that is potentially eligible to be an historic district. Thus, siting of a power plant on this parcel may result in impacts to historic structures. In addition, the Port's plans for the Western Pacific site are to develop and integrate it with its Pier 80 marine terminal operations immediately adjacent to the south. It is uncertain whether the siting of a power plant on the property would be compatible with Port plans, or consistent with the Port's mandate to use its public trust property to promote waterborne commerce, navigation and fisheries.

With the No Project Alternative, the land uses would remain as they are and are presumed to be consistent with existing land use plans and policies.

9.4.3.3.2 Noise. The ambient noise levels in the vicinity of the alternative project sites are dominated by vehicular traffic and the industrial nature of the area. The ambient noise levels are expected to be in the range of 55 dBA L_{90}. The alternative project sites (the proposed project site and the Illinois site) near to 23rd and Illinois Streets have the potential of impacting residential uses being located in the commercial areas (live/work units). The Western Pacific, and Cesar Chavez sites are further from residential receptors and would hence have lesser impacts on residential receptors. However, based on the noise modeling of the proposed project and the existing buildings in the area providing noise attenuation/screening, ambient noise levels are not expected to increase significantly due to operation of the SFERP. Therefore, the proposed project site, and the alternative sites are expected to have comparable noise impacts.

The No Project Alternative would not result in further development in these areas and ambient noise levels would remain unaffected. However, the potential to reduce noise from existing in-City generation at Hunters Point would be lost.

9.4.3.3.3 Public Health. All of the alternative sites are located in an industrial area of San Francisco, with nearby commercial/residential uses. Public health impacts are generally related to air quality, which is not expected to result in significant impacts. At a screening level, the sites appear equivalent with respect to this environmental resource.

Under the No Project Alternative, the existing Hunters Point plant would continue to operate resulting in more severe air quality impacts and associated Public Health impacts.

9.4.3.3.4 Worker Health and Safety. Potential impacts on worker health and safety are activity-specific rather than site-specific. Regardless of the location, the SFPUC will prepare appropriate health and safety plans to protect workers and reduce the potential for injuries. Therefore, the worker health and safety impacts from all of the alternative sites are equivalent.

Under the No Project Alternative, there would be no construction and, therefore, no impacts to workers.

9.4.3.3.5 Socioeconomics. All sites are located in San Francisco. In the case of all the site alternatives, most local purchases for construction and operation would be made in the greater Bay Area and would be the same regardless of the plant's location.

For all site alternatives, the workforce would likely come from San Francisco and the greater San Francisco Bay Area with its large, highly skilled construction work force.

Because SFERP would be owned by the City, no property taxes would be collected. Therefore, no jurisdiction would receive property taxes from this plant and there would be no difference from alternate sites.

Thus, the socioeconomic impacts would be similar among the alternatives since they are located near each other in San Francisco.

All of the alternative project sites are located within Southeast San Francisco. Therefore, the environmental justice issues would be substantially similar for all of the sites, although maximum distance from residential neighborhoods would be an advantage.

With the No Project Alternative, no economic benefits would be realized within the region of influence. Without the improved reliability that the SFERP would provide, there could also be other adverse economic impacts to the area.

9.4.3.3.6 Agriculture and Soils. The proposed and alternative project sites are located in urban, developed areas with no agricultural resources. Furthermore, due to the proximity of these sites to each other, the soil conditions are expected to be comparable. Therefore, impacts to agricultural and soil resources are expected to be comparable among these sites.

Under the No Project Alternative, agricultural and soils resources will not be affected.

9.4.3.3.7 Traffic and Transportation. Major freeways in proximity to the alternative site include Interstate 280 (I-280) and U.S. Highway 101 (US 101). From I-280 southbound, access to the alternative sites is via the 25th Street exit. From I-280 northbound, access is provided by the Cesar Chavez Street exit. From US 101, access to and from the alternative sites is via the Cesar Chavez Street interchange for both northbound and southbound traffic. Major and secondary arterial roadways within alternative site vicinity include Third Street, Bayshore Boulevard, Cesar Chavez Street, 23rd Street, and 25th Street.

Third Street, extending north from its interchange with US 101 and Bayshore Boulevard to its intersection with Market Street, functions as the principal north–south arterial within the area. It serves as the main commercial street, as well as a primary access route to industrial development along San Francisco's southern waterfront.

Cesar Chavez Street is a 4-lane major arterial and a Citywide Bicycle Route that extends to the west, traversing the Mission District and terminating at Guerrero Avenue. Cesar Chavez Street provides direct access to both I-280 and US 101.

Direct access to the Potrero site and other alternative sites is provided by 23rd Street. This roadway is undivided and provides one lane of travel in each direction.

Illinois Street is a wide two-lane undivided roadway west of the alternative sites and provided access to all of the sites. Traffic is controlled at the intersections of Illinois Street and 23rd and 25th streets.

Bayshore Boulevard is designated as a Neighborhood Commercial Street and a Citywide Bicycle Route. This 4-lane arterial parallels US 101, running from Third Street north to Cesar Chavez Street. Bayshore Boulevard is divided with a raised median, except for openings at intersections with exclusive left-turn lanes.

Since the alternative project sites all use the same system of roads and highways, the impacts due to construction and operation of a power plant at these sites are considered similar. Furthermore, traffic and transportation impacts associated with the construction and operation of the power plant at the Potrero site are considered less than significant.

The No Project Alternative would allow traffic to be maintained at current levels.

9.4.3.3.8 Visual Resources. The character of the alternative sites is heavily industrialized, with Port of San Francisco, Mirant's Potrero PP, and the Port's container terminal. To the west of the alternative sites is an area of commercial/light industrial uses, with residential uses interspersed. The City of San Francisco is allowing live/work development to occur in the area, which allows encroachment of non-conforming residential uses to occur in an area zoned industrial. The City considers these live/work units to be industrial uses.

The proposed power plant will require exhaust stacks approximately 85 feet tall, which will blend into the industrial nature of the existing environment. Views from residential areas will be screened for the proposed, Illinois, and Port of San Francisco's Pier 70 sites by existing commercial and industrial facilities. Additionally, these sites would have significant industrial facilities in the background, which will result in a power plant sited at these locations to blend into the environment, to some extent.

The Cesar Chavez and Western Pacific sites will also have significant industrial facilities in the backgrounds, but do not have the same level of commercial/industrial buildings screening these sites. However, the MUNI is planning to site a new streetcar maintenance facility due west of the site, which when constructed may obstruct views of these sites.

From the standpoint of residential neighborhoods, the visual impact of the proposed, Illinois and Pier 70 sites is similar and currently slightly better than the Cesar Chavez and Western Pacific sites. When the new MUNI street car maintenance facility is constructed, the visual impact of all sites on residential neighborhoods is likely to be substantially similar.

The No Project Alternative would avoid visual impacts from the development of a power plant. However, it would foreclose or delay closure of the Hunters Point Power Plant and redevelopment of the Hunters Point Power Plant site.

9.4.3.3.9 Hazardous Materials Handling. The same quantity of hazardous materials would be stored and used at the proposed and alternative project sites. Further, as stated earlier, the alternatives sites are in relative proximity. Thus, the impacts from hazardous materials

handling would not be substantially different among the sites. The City's off-site consequence analysis has confirmed that releases to residential/commercial areas (to the north, south and west of the proposed site) would be at a concentration of less than 5 ppm. Potential impacts would be further reduced in the case of alternative sites with additional distance from residences such as the Western Pacific and Cesar Chavez sites. However, because the potential impact on residences is already minimal, the additional benefit of further distance is not significant.

The No Project Alternative would avoid the transportation, use and storage of hazardous materials from construction and operation of the SFERP. However, if as a result of the No Project Alternative, it becomes necessary to install NO_x emission reduction technology on Hunters Point Power Plant Unit 4, the use of additional hazardous materials would result.

9.4.3.3.10 Waste Management. The same quantity of waste will be generated at the proposed site as at all alternative sites. The environmental impact of waste disposal would not differ significantly between the alternative sites.

The No Project Alternative would eliminate the need to dispose of liquid and solid waste from the construction and operation of the SFERP but would maintain the need to dispose of liquid and solid waste from existing in-City generation.

9.4.3.3.11 Water Resources. The SFPUC is proposing to use recycled water for most plant uses and potable water for domestic uses. Wastewater and storm water from the proposed and alternative sites will be directed to the City's combined sewer system. Therefore, the water resources impacts will be similar for all of the alternative sites, except the Cesar Chavez site, which would be too small for a water treatment plant to be located onsite.

The No Project Alternative would require sewage to be discharged in its current manner. While salt loadings would not change, this would avoid the additional salt concentrations that would occur from the plant's liquid waste stream being returned to the treatment plant. However, the No Project Alternative would not assist in reuse and disposal of wastewater from the City's SEWPCP. Moreover, with the No Project Alternative, existing water and sewer use by in-City generation would continue.

9.4.3.3.12 Geologic Hazards and Resources. Due to the screening level of this analysis and proximity of the sites to each other, no site-specific seismic analysis was performed. The potential for seismic impacts would be essentially the same for all plants and can be addressed in plant design.

The No Project Alternative would not affect geological hazards or resources.

9.4.3.3.13 Paleontological Resources. All of these sites are located primarily on artificial fill overlying either rocks of the Franciscan Complex or late Pleistocene to Holocene alluvium of the Temescal Formation. Each of the stratigraphic units has produced significant and scientifically important fossils in the San Francisco area. In addition, fossil sites were documented as occurring near the alternative project sites, and one known site is located near the Cesar Chavez site. Therefore, all sites are considered to have an equal potential for paleontological impacts.

9.5 Selection of the Proposed Site

Table 9-3 compares the potential environmental impacts of the proposed site (Potrero) with the other alternatives. As shown in the table, no alternative site would feasibly attain most of the basic objectives of the project while also avoiding or substantially lessening any potentially significant effects of the project.

TABLE 9-3
Comparison of the Proposed Site and Alternative Site Locations

Characteristic	Potrero Site (Proposed)	Western Pacific Site	Port of San Francisco's Pier 70 Site	Caeser Chavez Site	Illinois Street Site
Potential Presence of T&E Species/Habitat	Low	Low	Low	Low	Low
Potential Cultural/ Historic Sensitivity	Moderate to High	Moderate	High	Moderate	Moderate
Appropriate Zoning	Yes	Yes	Yes	Yes	Yes
Land Use Entitlements Required	No	Yes	No	No	No
Proximity to Sensitive Noise Receptors	Within 600 feet	Within 2,100 feet	Within 1,000 feet	Within 1,300 feet	Within 500 feet
Risk to Humans from Deposition of Air Pollutants	Low	Low	Low	Low	Low
Removal of Prime Agricultural Land	No	No	No	No	No
Traffic & Transportation	Low	Low	Low	Low	Low
Potential Visual Sensitivity	Low	Low to Moderate	Low	Low to Moderate	Low to Moderate
Risk to Humans from Off-site Migration of Hazardous Materials	Low	Low	Low	Low	Low
Ability to Use Water Consistent with SWRCB Policy	Yes	Yes	Yes	Uncertain	Yes
Potential Paleontological Sensitivity	Moderate	High	Moderate	High	Moderate
Availability of Property	Available	Subject to Public Trust	Limited by Burton Act	No interest in selling	Uncertain, complex ownership

The Final Staff Assessment for the proposed Potrero Unit 7 identified two significant impacts from a project at the Potrero site, impacts on the Bay from once through cooling and cultural impacts from the demolition of the meter and compressor structures. The SFERP avoids impacts on the Bay and reduces cultural impacts by preserving the Meter facility.

Three of the four alternatives, Illinois Street, Cesar Chavez and the Western Pacific Site would avoid the cultural impact of demolishing a potentially historic building without creating similar associated impacts. However, as described below, the City has identified the Potrero site as its preferred alternative, because of other disadvantages from the alternative sites. The Pier 70 location includes significantly more historic structures than the Potrero site, which would either have to be incorporated into the plant design, substantially increasing the cost of the project, or demolished.

The Potrero and Illinois sites are similar, being adjacent, as they are nearby tall industrial structures (PG&E's substation and Mirant's Potrero PP) in a heavily industrialized area, and are adjacent to the PG&E Substation and natural gas pipelines. Although both sites would require the demolition of existing structures currently onsite, an advantage of the Illinois site is that demolition of historic buildings could largely be eliminated whereas use of the Potrero site requires demolition of the Compressor House and Station A. However, given the complex land ownership, and the general lack of interest in a sale on the part of the owners, the City deemed obtaining the Illinois Street property to be uncertain. A further disadvantage of the property is that it would likely have required the City to acquire substantially more property than needed to site the SFERP with the attendant additional costs.

The Port of San Francisco's Pier 70 site is also close to the required infrastructure (natural gas and the PG&E Substation). However, the site is part of a potential historic district and would require either the alteration of historic buildings or their removal.

The Western Pacific site is located on the Port of San Francisco's container terminal and is an undeveloped parcel. It is close to the required infrastructure and is located further away from residential use area. If the MUNI were to construct its maintenance facility to the west, this new facility would tend to screen most of the power plants features from views. However, the Western Pacific site is subject to the public trust for navigation, waterborne commerce and fisheries. The Port plans for the site are to integrate it into its adjacent Pier 80 terminal complex, and it is not clear that the power plant would be consistent with this planned use. In addition, since this power plant is not dependent upon a waterfront location in order to operate, there is no precedent for allowing this use on public trust land. The entitlement process for determining whether the plant could be characterized as a permitted use that directly supports other public trust purposes is lengthy and uncertain, and for this reason the City has determined that the Potrero site is preferable. The Cesar Chavez site is located west of the Western Pacific site, but is not on Port of San Francisco property. The site does not contain historic buildings. However, the Potrero site was determined by the City to be preferable in light of the lack of interest in a sale by the owner and potential complications from the owner's divorce and the property's status as community property. Moreover, the small size could create construction challenges, increased operation costs and uncertainty regarding the use of recycled water for cooling because a water treatment plant would need to be located elsewhere.

9.6 Alternative Air Pollution Emission Control Analysis

The proposed project is required to comply with the requirements of the Bay Area Air Quality Management District's (BAAQMD) permit regulations requiring the application of the Best Available Control Technology (BACT) to control air emissions. To comply with the BAAQMD's

BACT requirements for oxides of nitrogen (NO_x), the project's design includes water injection and selective catalytic reduction (SCR) to control NO_x emissions. The SCR technology proposed for the SFERP uses a 29 percent solution of ammonia to reduce NO_x emissions to elemental nitrogen, water, and a small quantity of unreacted ammonia. However, the use and storage of ammonia—even the less toxic 29 percent aqueous ammonia proposed for the SFERP project—represents a potential risk to the public in the event of a catastrophic breach of the storage tank. The offsite consequence analysis (presented in Section 8.12 of the AFC) shows that if the SFERP's ammonia storage tank were breached, the resulting ammonia concentrations (at publicly accessible areas along the project's northern and southern fence lines) would be below the olfactory level for most people (less than 5 parts per million). Therefore, the potential impacts associated with the project's use and storage of ammonia would not result in a significant public health impact. However, to provide a comprehensive analysis of the alternative project configuration, the remainder of this section presents alternative NO_x emission control technologies considered for the project. The information presented below is based on the air quality analysis presented in Appendix 8.1E of the AFC.

Potential NO_x control technologies for combustion gas turbines include the following:

- **Combustion controls**
 - Water injection
 - Steam injection
 - Dry combustion controls
 - Dry low-NO_x combustor design
 - Catalytic combustors (e.g., XONON)
- **Post-combustion controls**
 - Selective non-catalytic reduction (SNCR)
 - Non-selective catalytic reduction (NSCR)
 - Selective catalytic reduction (SCR)
 - SCONO$_x$™

The technical feasibility of available NO_x control technologies are presented below.

9.6.1 Combustion Modifications

9.6.1.1 Wet Combustion Controls

Steam or water injection directly into the turbine combustor is one of the most common NO_x control techniques. These wet injection techniques lower the peak flame temperature in the combustor, reducing the formation of thermal NO_x. The injected water or steam exits the turbine as part of the exhaust.

Although the lower peak flame temperature has a beneficial effect on NO_x emissions, it can also reduce combustion efficiency and prevent complete combustion. As a result, carbon monoxide (CO) and volatile organic compounds (VOC) emissions increase as water/steam injection rates increase.

Water and steam injection have been in use on both oil- and gas-fired combustion turbines in all size ranges for many years, so these NO_x control technologies are clearly technologically feasible and widely available. The proposed SFERP's LM6000 combustion turbines employ water injection to control NO_x emissions.

9.6.1.2 Dry Combustion Controls

Combustion modifications that lower NO_x emissions without wet injection include lean combustion, reduced combustor residence time, lean premixed combustion, and two-stage rich/lean combustion. Lean combustion uses excess air (greater than stoichiometric air-to-fuel ratio) in the combustor primary combustion zone to cool the flame; thereby, reducing the rate of thermal NO_x formation. Reduced combustor residence times are achieved by introducing dilution air between the combustor and the turbine sooner than with standard combustors. The combustion gases are at high temperatures for a shorter time, which also has the effect of reducing the rate of thermal NO_x formation.

The most advanced combination of combustion controls for NO_x is referred to as dry low-NO_x (DLN) combustors. DLN technology uses lean, premixed combustion air to keep peak combustion temperatures low, thus reducing the formation of thermal NO_x. This technology is effective in achieving NO_x emission levels comparable to levels achieved using wet injection without the need for large volumes of purified water and without the increases in CO and VOC emissions that result from wet injection. However, this control technology does not result in lower NO_x emissions than can be achieved using water injection on the LM6000 combustion turbine.

Catalytic combustors use a catalytic reactor bed mounted within the combustor to burn a very lean fuel-air mixture. This technology has been commercially demonstrated under the trade name XONON in a 1.5 MW natural gas-fired combustion turbine in Santa Clara, California, and commercial availability of the technology for a 200 MW GE Frame 7 natural gas-fired combustion turbine was recently announced for one project. (The technology has also been announced as commercially available for some models of small combustion turbines, generally 10 MW in size and less.) The technology has not been announced commercially for the engines used at SFPUC. No turbine vendor, other than General Electric, has indicated the commercial availability of catalytic combustion systems at the present time; therefore, catalytic combustion controls are not available for this specific project and are not discussed further.

9.6.1.3 Post-Combustion Controls

SCR is a post-combustion technique that controls both thermal and fuel-bound NO_x emissions by reducing NO_x with a reagent (generally ammonia or urea) in the presence of a catalyst to form water and nitrogen. NO_x conversion is sensitive to exhaust gas temperature, and performance can be limited by contaminants in the exhaust gas that may mask the catalyst (sulfur compounds, particulates, heavy metals, and silica). SCR is used in numerous gas turbine installations throughout the United States, almost exclusively in conjunction with other wet or dry NO_x combustion controls. SCR requires the consumption of a reagent (ammonia or urea) and requires periodic catalyst replacement. Estimated levels of NO_x control are in excess of 90 percent.

Selective non-catalytic reduction (SNCR) involves injection of ammonia or urea with proprietary conditioners into the exhaust gas stream without a catalyst. SNCR technology requires gas temperatures in the range of 1,200 to 2,000° F and is most commonly used in boilers. The exhaust temperatures for the SFERP gas turbines are in the 800° F range, which is well below the minimum SNCR operating temperature. Some method of exhaust gas reheat, such as additional fuel combustion, would be required to achieve exhaust temperatures compatible with SNCR operations, and this requirement makes SNCR technologically infeasible for the SFERP.

Nonselective catalytic reduction (NSCR) uses a catalyst without injected reagents to reduce NO_x emissions in an exhaust gas stream. NSCR is typically used in automobile exhaust and rich-burn stationary internal combustion (IC) engines, and employs a platinum/rhodium catalyst. NSCR is effective only in a stoichiometric or fuel-rich environment where the combustion gas is nearly depleted of oxygen, and this condition does not occur in turbine exhaust where the oxygen concentrations are typically between 14 and 16 percent. For this reason, NSCR is not technologically feasible for the SFERP.

$SCONO_x$™ is a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO_x, CO, and VOC emissions. The catalyst is a monolithic design, made from a ceramic substrate with both a proprietary platinum-based oxidation catalyst and a potassium carbonate adsorption coating. The catalyst simultaneously oxidizes NO to NO_2, CO to CO_2, and VOCs to CO_2 and water, while NO_2 is adsorbed onto the catalyst surface where it is chemically converted to and stored as potassium nitrates and nitrites. The $SCONO_x$ potassium carbonate layer has a limited adsorption capability and requires regeneration approximately every 12 to 15 minutes in normal service (see Appendix 8.1E for details). Each regeneration cycle requires approximately 3 to 5 minutes. At any point in time, approximately 20 percent of the compartments in a $SCONO_x$ system would be in regeneration mode, and the remaining 80 percent of the compartments would be in oxidation/absorption mode.

There are serious questions about the probability of a successful commercial demonstration and the commercial availability of the $SCONO_x$ technology for application to SFERP, as well as the levels of emission control that can be consistently achieved. Therefore, this technology is not considered feasible for the SFERP.

9.6.2 Alternatives to Ammonia-based Emission Control Systems

Over the last few years, several vendors have designed urea-based systems to generate ammonia onsite, thereby eliminating the need to transport and store ammonia. These units are referred to Ammonia on Demand (Environmental Elements Corporation) and Urea to Ammonia (EC&C Technologies Incorporated). However, on September 9, 2003, a permanent injunction was issued against Environmental Elements Corporation, barring the company from selling or manufacturing the Ammonia on Demand system due to patent infringement on EC&C Technologies Inc. Therefore, only EC&C's Urea to Ammonia (U2A) system is commercially available.

The U2A system generates ammonia from solid dry urea. The process starts by dissolving urea in deionized water to produce an aqueous urea solution. Steam is used in the urea to ammonia

reactor to converted the urea solution into a gaseous mixture of ammonia, carbon dioxide, and water for use in the SCR system.

The U2A technology was first commercially installed on AES's Alamitos Generating Station (AGS) Unit 6, in Long Beach California, as a demonstration project. Unit 6 is a utility boiler that had an existing SCR system that used and stored ammonia. The U2A technology replaced the ammonia storage tank. Based on a successful demonstration of the U2A at AGS, AES contracted for the permanent installation of two U2A systems at its Huntington Beach Generating Station (HBGS) in Huntington Beach, California.

Based on the success of these projects, the U2A technology has been selected for a number of utility retrofit projects. However, as stated above, the U2A technology requires steam for the process to work and the SFERP project will not be generating steam. Therefore, this technology is not feasible for the SFERP. Furthermore, there is some concern regarding the applicability of the U2A technology for use on a peaking combustion turbine that is not expected to operate continuously.

9.7 Alternative Project Configurations

The proposed project configuration is the result of considering a variety of design and operating limitations. The main factors affecting the configuration include available gas turbine-generators provided as a result of the State of California's settlement with the Williams Companies, the need for fast-starting electrical generation to increase electrical reliability in San Francisco, environmental justice, and cost. The City reviewed a number of alternative configurations, including siting two sets of combustion turbines at difference sites, siting four combustion turbines at one site, and the proposed configuration of siting three combustion turbines at one site and one combustion turbine elsewhere. The proposed configuration was selected as a result of environmental justice considerations and numerous costs and logistic issues.

9.8 Alternative Technologies

Section 3.0, Purpose and Need, addresses why the SFERP is needed to meet the City's objectives of improving reliability and replacing inefficient and dirty in-City generation. That section discusses why transmission, energy efficiency improvements, renewable resources and distributed generation are insufficient to accomplish the City's objectives. This section discusses alternatives for generating technologies according to the fuel used.

- Oil and natural gas
- Coal
- Nuclear
- Hydroelectric
- Geothermal
- Biomass
- Solar
- Wind

Alternative technologies were evaluated with respect to commercial availability, implementability, and cost-effectiveness.

9.8.1 Oil; Natural Gas; Coal; Conventional and Supercritical Boiler/ Steam Turbine, or Combined-Cycle Combustion Turbine

These technologies are commercially available, and could be implemented. However, because of the long unit startup times and limited operational requirements of the City to satisfy the reliability demands and to meet the project objectives, these technologies were eliminated from consideration.

9.8.2 Nuclear

California law prohibits new nuclear plants until the scientific and engineering feasibility of disposal of high-level radioactive waste has been demonstrated. To date, the CEC is unable to make the findings of disposal feasibility required by law for this alternative to be viable in California. The technology, therefore, is not implementable.

9.8.3 Hydroelectric

No significant hydroelectric resource is available within San Francisco and thus would not facilitate the shutdown of Hunters Point Power Plant in the near term, nor would it provided added reliability to the electrical system in San Francisco.

9.8.4 Geothermal

Geothermal development is not viable within San Francisco because suitable thermal vents and strata are not present. It was, therefore, eliminated from consideration.

9.8.5 Biomass

Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing waste, and construction and urban wood wastes. Their cost tends to be high relative to simple-cycle units burning natural gas and fuel supply reliability can be problematic in urban settings. Furthermore, this technology typically results in higher air emissions, water consumption/discharge, and waste generation over the proposed project. Finally, this technology is typically used in baseload (continuous) operations and is not readily useful for peaking situations.

9.8.6 Solar

Most of these technologies collect solar radiation, heat water to create steam, and use the steam to power a steam turbine/generator. Power is only available while the sun shines so the units do not supply power that can be cycled up or down to follow demand. Given the objectives of this proposed project to improve the reliability of San Francisco's electrical system, this technology is not considered to be a feasible project alternative due to the limited size of the individual projects (less than a megawatt), and the sheer number of projects that would be required to generate 145 megawatts.

9.8.7 Wind Generation

In California, the average wind generation capacity factor has been 25 to 30 percent and, like solar, cannot be cycled up and down to track demand. There are no significant wind generation sites located in San Francisco. Furthermore, this technology would not increase the reliability of the electrical infrastructure sufficiently to facilitate the shutdown of Hunters Point Power Plant.

9.9 References

California Energy Commission. 1995. 1994 Biennial Electricity Report (ER94), P300-95-002. November.

San Francisco Public Utilities Commission. 2002. The Electricity Resource Plan. Revised December 2002.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	Potrero (Proposed)	Port of San Francisco's Western Pacific	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Air Quality	Emissions from the plant would be the same at every location. It is assumed that offsets would be available for every site. Given the design of the project, air impacts would be expected to be less than significant.	Emissions from the plant would be the same at every location. It is assumed that offsets would be available for every site. Construction impacts would be slightly higher since this site would require a longer transmission line. Given the design of the project, air impacts would be expected to be less than significant.	No difference.	No difference.	Emissions from the plant would be the same at every location. It is assumed that offsets would be available for every site. Construction impacts would be slightly higher since this site would require a longer transmission line. Given the design of the project, air impacts would be expected to be less than significant.
Biological Resources	This industrial site is developed with no habitat value. No biological impacts are expected. Alternative sites are similar in nature.	No difference.	No difference.	No difference.	No difference.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	Potrero (Proposed)	Port of San Francisco's Western Pacific	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Cultural Resources	The Potrero Point area, due to the long history of industrial activity in the area, has a moderate potential for encountering buried historic resources during construction. In addition, the site includes several historic buildings one of which has been included in the project's design. The shoreline of the San Francisco Bay was heavily used by prehistoric Native American populations.	The Potrero Point area, due to the long history of industrial activity in the area, has a moderate potential for encountering buried historic resources during construction. The shoreline of the San Francisco Bay was heavily used by prehistoric Native American populations.	The Port of San Francisco's Pier 70 site is located on the Union Iron Works Pier 70 Historic District, with 23 eligible historic buildings. The development of a power plant on this site would require the demolition or modification of a historic structure in a potentially eligible historic district. It is possible that the power plant could be developed to minimize impacts to historic structures, but in any event it would alter the feel and setting of the potentially eligible historic district.	The Potrero Point area, due to the long history of industrial activity in the vicinity, has a moderate potential for encountering buried historic resources during construction. The shoreline of the San Francisco Bay was heavily used by prehistoric Native American populations. The site includes potentially historic buildings, in particular sugar wear-houses; but a power plant could likely be constructed without demolition of these buildings.	The Potrero Point area, due to the long history of industrial activity in the area, has a moderate potential for encountering buried historic resources during construction. The shoreline of the San Francisco Bay was heavily used by prehistoric Native American populations.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	Potrero (Proposed)	Port of San Francisco's Western Pacific	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Land Use	The site is zoned Industrial. No entitlements would be required.	The site is zoned Industrial. The Port Commission plans to develop and integrate this site into its adjacent Pier 80 marine terminal. The property is subject to the public trust for navigation, waterborne commerce and fisheries. There is uncertainty as to the compatibility of the project with the planned use of the site, and the consistency of the project with the public trust doctrine. The entitlement process would be lengthy, and the outcome uncertain.	The site is zoned Industrial. The Port Commission plans to preserve the complex of historic structures located on and around this site, and is commencing a master planning process for the area to develop a mix of maritime, commercial, educational and recreational uses. This site is subject to the Burton Act, the statutory trust grant that establishes the Port Commission's authority, although the site could be determined to be surplus to the needs of the trust, and leased for non-trust uses. The site is currently used for City towing contract operations.	No difference.	No difference.
Noise	The plant's noise output would be approximately the same at all sites. The nearest residence is located within 500 feet from the site.	The plant's noise output would be approximately the same at all sites. However, the nearest residence is located within 4,000 feet from the site.	The plant's noise output would be approximately the same at all sites. However, the nearest residence is located within 400 feet from the site.	The plant's noise output would be approximately the same at all sites. However, the nearest residence is located within 1,600 feet from the site.	The plant's noise output would be approximately the same at all sites. However, the nearest residence is located within 3,000 feet from the site.
Public Health	The impacts are directly related to air quality impacts described above, considered to be less than to be significant.	No difference.	No difference.	No difference.	No difference.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	Potrero (Proposed)	Port of San Francisco's Western Pacific	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Worker Health and Safety	Safety training programs and general health and safety programs will be the same for all alternatives.	No difference.	No difference.	No difference.	No difference.
Socioeconomics	Potential impact to schools and public services is anticipated to be less than significant and given the proximity of the sites to each other, impacts are expected to be similar at all locations. Because all the properties are located in Southeast San Francisco, the environmental justice impacts for all sites would be similar.	No difference.	No difference.	No difference.	No difference.
Agriculture and Soils	The Potrero Point area has a long history of industrial activity that does not include agricultural uses. No impacts to agriculture and soils are expected.	No difference.	No difference.	No difference.	No difference.
Traffic and Transportation	No hazardous intersections apparent. No significant impacts on traffic and transportation are expected.	No difference.	No difference.	No difference.	No difference.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	Potrero (Proposed)	Port of San Francisco's Western Pacific	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Visual Resources	The plant would be surrounded by other industrial/commercial structures that would partially screen most of the facility from the views of most viewers. With mitigation measures, impacts would be less than significant.	Currently, the plant would be visible from views on Potrero Hill. However, if MUNI constructs its maintenance facility west of the site, then views will be partially screened by this facility. With mitigation measures, impacts would be less than significant.	No difference.	The plant would be surrounded by other industrial/commercial structures that would partially screen most of the facility from the views of most viewers. The plant would be located adjacent to a street and would require screening from travelers along the street. With mitigation measures, impacts would be less than significant.	Currently, the plant would be visible from views on Potrero Hill. However, if MUNI constructs its maintenance facility west of the site, then views will be partially screened by this facility. The plant would be located adjacent to a street and would require screening from travelers along the street. With mitigation measures, impacts would be less than significant.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	Potrero (Proposed)	Port of San Francisco's Western Pacific	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Hazardous Material Handling	Aqueous ammonia shipments would likely be delivered using US 101, exiting on Cesar Chavez, which is a designated truck route. The off-site consequences analysis shows that the ammonia concentrations from the worst case release would not result in a significant impact in publicly accessible areas due to a catastrophic release of ammonia. Because the sites are relatively close to each other, it is expected that impacts from hazardous waste handling would be similar, although impacts could be more problematic in the case of the Illinois Street and Cesar Chavez locations where the plant would be located close to the street.	No difference.	No difference.	Aqueous ammonia shipments would likely be delivered using US 101, exiting on Cesar Chavez, which is a designated truck route. Because the plant would be located close to the street, the plant would have to be designed such that publicly accessible areas are not impacted in the event of a catastrophic release of ammonia.	Aqueous ammonia shipments would likely be delivered using US 101, exiting on Cesar Chavez, which is a designated truck route. Because the plant would be located close to the street, the plant would have to be designed such that publicly accessible areas are not impacted in the event of a catastrophic release of ammonia.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	Potrero (Proposed)	Port of San Francisco's Western Pacific	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Waste Management	The City will implement measures to comply with San Francisco's recycling goals and with these measures the project's contribution to total waste generated in the county will be minimal. Hazardous waste treatment and disposal capacity in California is more than adequate. Accordingly, waste management will not create a significant impact. Impacts at all sites is expected to be similar.	No difference.	No difference.	No difference.	No difference.
Water Resources	Would use recycled wastewater, a potential beneficial impact. Recycled wastewater would be used at all of the alternatives sites.	No difference.	No difference.	No difference.	Use of recycled water is uncertain because site is not large enough to put onsite and the SEWPCP does not currently provide recycled water.
Geologic Hazards	No known natural resources occur in the site and the project will be designed and constructed to withstand ground-shaking. Thus, geologic impacts are expected to be less than significant. Because of their proximity, alternatives sites are expected to have similar geologic impacts.	No difference.	No difference.	No difference.	No difference.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	Potrero (Proposed)	Port of San Francisco's Western Pacific	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Paleontological Resources	The stratigraphic units underlying the site have produced significant and scientifically important fossils in the San Francisco area. Nonetheless, with mitigation, the impact on paleontological resources is expected to be less than significant. Because of their proximity, alternative sites are generally expected to have similar impacts on paleontological resources.	The stratigraphic units underlying the site have produced significant and scientifically important fossils in the San Francisco area. A known fossil location was identified on the north shore of Islais Creek. Nonetheless, with mitigation, the impact on paleontological resources is expected to be less than significant.	No difference.	No difference.	The stratigraphic units underlying the site have produced significant and scientifically important fossils in the San Francisco area. A known fossil location was identified on the north shore of Islais Creek. Nonetheless, with mitigation, the impact on paleontological resources is expected to be less than significant.

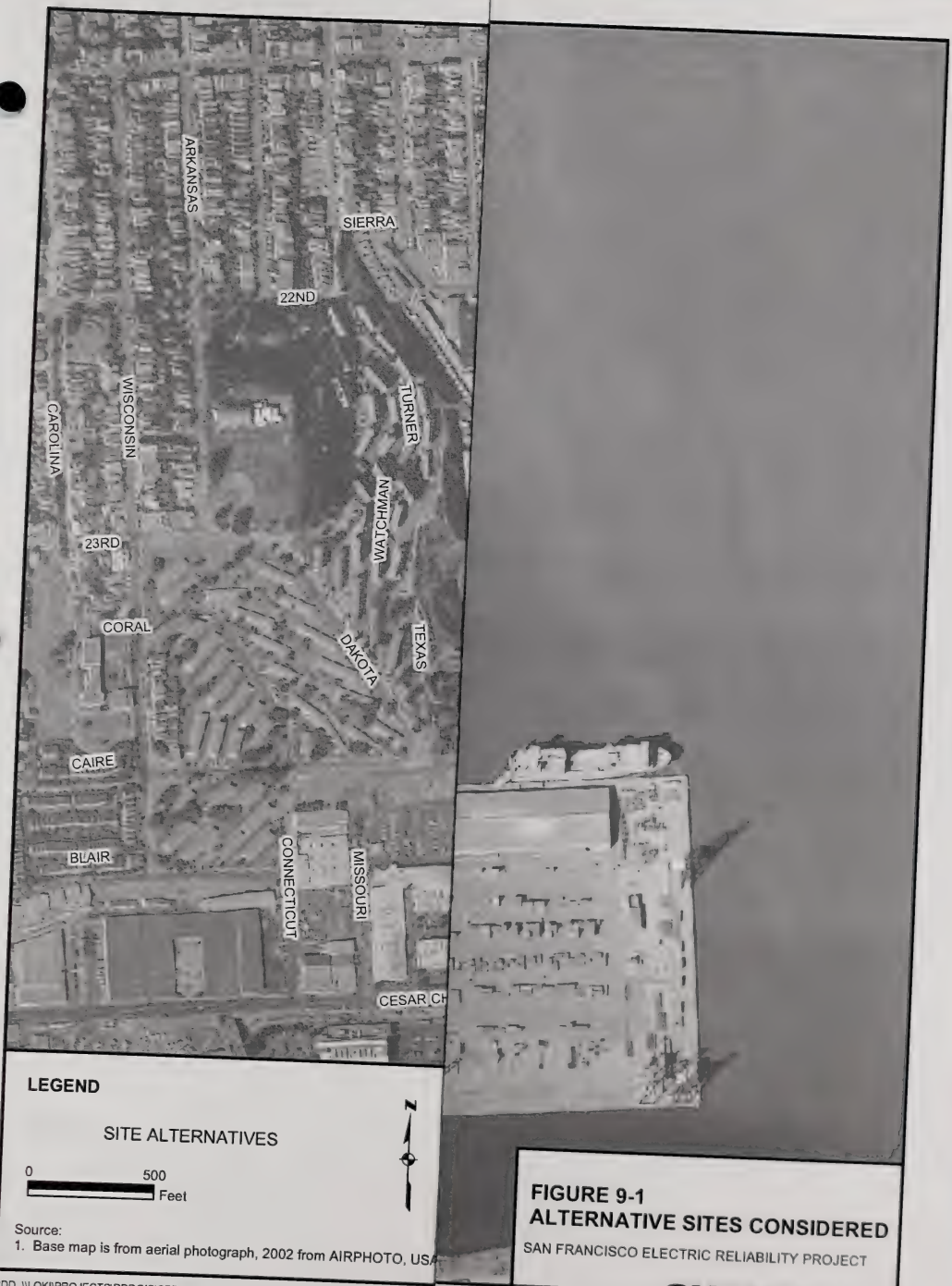


FIGURE 9-1
ALTERNATIVE SITES CONSIDERED
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT



FIGURE 9-1
ALTERNATIVE SITES CONSIDERED
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SECTION 10.0

Engineering

SECTION 10.0

Engineering

This section and its related appendices, together with Sections 2, 5, 6, and 7, present information concerning the design and engineering of the San Francisco Electric Reliability Project (SFERP), Phases 1 and 2. Subsection 10.1 describes the design of the facility with reference to Section 2, Project Description. Subsection 10.2 discusses the reliability of SFERP. Subsection 10.3 presents the estimated thermal efficiency of the facility. Subsection 10.4 describes the laws, ordinances, regulations, and standards (LORS) applicable to SFERP engineering and identifies agencies that have jurisdiction. Section 10.5 provides the contact persons within those agencies.

10.1 Facility Design

A detailed description of the SFERP project is provided in Subsection 2.2, Project Description, Design, and Operation. Safety design features are described in Subsection 2.3, Facility Safety Design.

Summary descriptions of the design criteria are included in: Appendix 10A, Civil Engineering Design Criteria; Appendix 10B, Structural Engineering Design Criteria; Appendix 10C, Mechanical Engineering Design Criteria; Appendix 10D, Electrical Engineering Design Criteria; Appendix 10E, Control Engineering Design Criteria; and Appendix 10F, Chemical Engineering Design Criteria. Appendix 10G, Geologic and Foundation Design Criteria, sets forth a geotechnical assessment of the SFERP project site.

Design and engineering information and data for the following systems are found in the following parts of the Application for Certification (AFC):

- **Power Generation**—Subsection 2.2, Project Description, Design, and Operation
- **Heat Dissipation**—Subsection 2.2, Project Description, Design, and Operation
- **Cooling Water Supply System**—Subsection 2.2, Project Description, Design, and Operation
- **Air Emission Control System**—Subsection 2.2, Project Description, Design, and Operation, and Subsection 8.1, Air Quality
- **Waste Disposal System**—Subsection 2.2, Project Description, Design, and Operation, and Subsection 8.14, Waste Management
- **Noise Abatement System**—Subsection 8.5, Noise
- **Switchyards/Transformer Systems**—Section 5, Electric Transmission

10.2 Reliability

This section discusses the availability of fuel, the expected service life of the plant, and the degree of reliability to be achieved by SFERP.

10.2.1 Fuel Availability

The supply pipeline to SFERP is connected to Pacific Gas and Electric Company's (PG&E's) San Francisco Load Center located on the adjacent PG&E Potrero Substation. The San Francisco Load Center is capable of delivering the required quantity of gas to SFERP. The San Francisco Load Center is supplied by three natural gas lines (101, 109, and 132), which will provide the SFERP facility with a reliable source of natural gas. The SFERP facility has no backup fuel supply.

10.2.2 Plant Availability

SFERP is a peaking facility and therefore does not have some redundancy that a base load plant may require. SFERP is designed to operate between approximately 15 and 100 percent of base load. SFERP will be designed for an operating life of 30 years. Reliability and availability projections are based on this operating life, however, the actual operating life will be based on City of San Francisco (City) policy, economics, and other factors. Operation and maintenance procedures will be consistent with industry standard practices to maintain the useful life status of plant components.

The SFERP simple-cycle power block consists of three natural gas-fired combustion turbine generators (CTGs). The CTG power block is projected to operate between 15 and 100 percent of the time during each year of its operating life. The percentage of time that the power block is projected to operate is defined as the "service factor." The service factor considers the amount of time that a unit is operating and generating power, whether at full or partial load. The projected service factor for the power block, which considers projected percentage of time of operation, differs from the "equivalent availability factor" (EAF), which considers the projected percentage of energy production capacity achievable. EAF is defined as a weighted average of the percentage of full energy production capacity achievable. The projected EAF for SFERP is estimated to be in the range of 94 to 98 percent. The EAF differs from the "availability of a unit," which is the percentage of time that a unit is available for operation, whether at full load, partial load, or on standby.

10.2.3 Water Availability

Makeup supply water will be process water provided by the City and County of San Francisco (City), which will be treated onsite to Title 22 recycled water standards. The recycled water plant receives its water from a new City process water supply line from a collection box near Martin and Cesar Chavez in San Francisco. A backup supply is provided by an appropriate connection (air gap separation of recycled and potable water systems) to the City potable water system. Process water is produced by an onsite water treatment system from the process water supply. Water for potable use at SFERP is from a connection to the City potable water system in 23rd Street. An onsite recycled water storage tank provides enough water for short-term operation and controlled shutdown of the plant. An onsite demineralized water storage tank provides water for short-term periods of operation of the gas turbines.

10.2.4 Waste Disposal Availability

SFERP waste disposal consists of waste from the recycled water treatment plant, nonhazardous cooling water, and other nonhazardous industrial wastewater streams. This combined stream will be returned to the City combined sewer system. Most hazardous wastes will be collected and recycled by permitted recycling firms, and hazardous wastes that cannot be recycled will be collected by a licensed hazardous waste hauler and deposited in a licensed hazardous waste landfill. For detailed information on the use of hazardous materials and management of wastes, see Subsections 8.12 and 8.13.

10.3 Efficiency

SFERP plant efficiency, approximately 36 percent, is one of the highest thermal efficiencies available from a natural gas-fired, gas-turbine, simple-cycle power plant. This level of efficiency is achieved when each combustion turbine operates at base load (100 percent load) with water injection for performance enhancement and emissions control. Operation at partial output will result in lower efficiencies.

The minimum fuel gas consumption is determined by the minimum operating load on a single CTG.

SFERP's net annual electrical production cannot be forecast accurately because the plant will be operated as a dispatchable power plant. The maximum annual generation possible from the facility is estimated to be roughly 580 gigawatt hours (GWh).

The California Department of Water Resources (DWR) has entered into a Power Purchase Agreement with the City for the output of the SFERP. Thus, the number of hours SFERP will operate will depend ultimately on electric and reliability requirements of DWR and the California Independent Systems Operator (CAISO).

10.4 Laws, Ordinances, Regulations, and Standards

The LORS that are applicable to the design of SFERP are referenced in Table 10-1 below. LORS applicable to the environmental areas of the AFC (Subsections 8.1 through 8.16) are contained within each of the environmental sections. The project will conform to all of these LORS.

The appendices to Section 10 contain the discipline design criteria that will be used in SFERP design. Appendices 10A and 10B address the physical design criteria for the site-related features, structures, and foundations of the facility. Appendices 10C through 10F provide the design criteria for SFERP systems and equipment, including the codes and standards that apply to the design, materials, fabrication, and erection of the systems and equipment. The project will also comply fully with these codes and standards. Appendix 10G, Geologic and Foundation Design Criteria, includes the geotechnical assessment of SFERP project site.

TABLE 10-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Location in AFC for Facility Design Compliance	Conformance
Federal:		
Occupational Safety and Health Act (OSHA) – 29CFR1910 and 29CFR126	Subsection 8.7	Meet Requirements
Environmental Protection Agency (EPA) – 40CFR60, 40CFR75, 40CFR112, 40CFR302, 40CFR423, 40CFR50, 40CFR100, 40CFR260, 40CFR300, and 40CFR400	Subsection 8.1 & Section 10	Meet Requirements
Federal Aviation Agency (FAA) – Obstruction Marking and Lighting AC No. 70/74601H	Sections 6 & 10	Meet Requirements
California:		
California Code of Regulations (CCR) – Title 8, Sections 450 and 750 and Title 24, 1995, Titles 14, 17, 19, 20, 22, 23, and 26.	Section 10	Meet Requirements
California Department of Transportation (Cal-DOT)-Standard Specifications	Subsection 8.10	Meet Requirements
California Occupational Safety and Health Administration (Cal-OSHA) – Regulations and Standards	Subsection 8.7	Meet Requirement
California Business and Professions Code – Sections 6704, 5730, and 6736	Section 10	Meet Requirements
California Vehicle Code – Section 35780	Subsection 8.10	Meet Requirements
California Labor Code – Section 6500	Subsection 8.7	Meet Requirements
Local:		
City and County of San Francisco – Regulations and Ordinances	Section 10	Meet Requirements
Industrial:		
Civil Engineering Design Criteria	Appendix 10A	Meet Design Criteria
Structural Engineering Design Criteria	Appendix 10B	Meet Design Criteria
Mechanical Engineering Design Criteria	Appendix 10C	Meet Design Criteria
Control Engineering Design Criteria	Appendix 10E	Meet Design Criteria
Chemical Engineering Design Criteria	Appendix 10F	Meet Design Criteria
Geologic and Foundation Design Criteria	Appendix 10G	Meet Design Criteria

10.5 Involved Agencies and Agency Contacts

Table 10-2 contains a list of involved agencies and agency contacts.

TABLE 10-2
Agency Contacts

Agency	Contact	Telephone
CCSF Department of Planning 1660 Mission Street San Francisco, CA 94103	Gerald Green, AICP Director	(415) 558-6411
San Francisco Fire Department	Mary Boucher, Fire Inspector	(415) 558-3306
San Francisco Department of Public Health	Sue Cone, Program Manager	(415) 252-3991